



# **≡ SERIES**

## **SERVICE MANUAL**



## CREDITS/COPYRIGHT

©2001-2002 Best Lock Corporation dba Best Access Systems. All rights reserved. Printed in the United States of America.

Information in this document is subject to change without notice and does not represent a commitment on the part of Best Access Systems.

This publication is intended to be an accurate description and set of instructions pertaining to its subject matter. However, as with any publication of this complexity, errors or omissions are possible. Please call your BEST distributor or Best Access Systems at (317) 849-2250 if you see any errors or have any questions. No part of this manual and/or databases may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or information storage and retrieval systems, for any purpose, without the express written permission of Best Access Systems.

This document is distributed as is, without warranty of any kind, either express or implied, respecting the contents of this book, including but not limited to implied warranties for the publication's quality, performance, merchantability, or fitness for any particular purpose. Neither Best Access Systems, nor its dealers or distributors shall be liable to the user or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by this publication.

The Life Safety Code is a registered trademark of the National Fire Protection Association.

Written and designed by Best Access Systems and Avalon Group, Inc., Indianapolis, Indiana.

T61839 Rev - 1879076 ER7991-6 June 2002

---

---

# CONTENTS

## FIGURES V

## GETTING STARTED 1-1

- Introduction 1-1
- Product family diagram 1-2
- Certifications and standards 1-2
- Documentation package 1-3
- Technical support 1-3
  - Support services 1-3
  - Telephone and web technical support 1-3

## PARTS FOR 1E SERIES 2-1

- Exploded diagrams and parts lists 2-2
  - Mortise cylinder 2-2
  - Rim cylinder 2-3
  - Thumbturn cylinder 2-4
  - Direct motion cabinet cylinder 2-5
  - Lost motion cabinet cylinder 2-6
- Special mortise cylinder applications 2-7
  - Dust cover cylinder 2-7
  - Wrench-resistant cylinder 2-7
  - Lost motion cylinder 2-7
  - Hotel shifting cam cylinder 2-8
  - Non-UL high security cylinder 2-8
  - Tapered-head cylinder 2-8
- Trim parts 2-9
  - Rim dummy trim 2-9
  - Mortise dummy trim 2-9
  - Stamped cylinder rings 2-10

|                                 |      |
|---------------------------------|------|
| Stamped cylinder ring packages  | 2-10 |
| Straight cylinder rings         | 2-11 |
| Wrench-resistant cylinder rings | 2-12 |
| Mounting plates                 | 2-13 |
| Tools                           | 2-14 |
| Cam identification              | 2-15 |
| Straight cams                   | 2-15 |
| Cloverleaf cams                 | 2-19 |
| Cabinet cams                    | 2-20 |
| Roller cams                     | 2-23 |
| Two-point cams                  | 2-24 |

### **PARTS FOR 3E SERIES 3-1**

|  |     |
|--|-----|
| Mortise cylinder exploded diagram and parts list | 3-2 |
| Trim parts                                       | 3-3 |
| Stamped cylinder rings                           | 3-3 |
| Tools  | 3-3 |
| Cam identification                               | 3-4 |
| Straight cams                                    | 3-4 |
| Cloverleaf cams                                  | 3-4 |
| Roller cams                                      | 3-5 |

### **PARTS FOR 5E SERIES 4-1**

|                                 |     |
|---------------------------------|-----|
| Exploded diagram and parts list | 4-2 |
| Lost motion cabinet cylinder    | 4-2 |
| Limited motion cabinet cylinder | 4-3 |
| Trim parts                      | 4-4 |
| Cylinder rings                  | 4-4 |
| Mounting plates                 | 4-6 |
| Tools                           | 4-6 |
| Cam identification              | 4-7 |

### **SERVICE AND MAINTENANCE 5-1**

|   |      |
|---|------|
| Replacing parts                         | 5-2  |
| Replacing the standard mortise cylinder | 5-2  |
| Replacing the cylinder ring             | 5-7  |
| Replacing riveted cams                  | 5-8  |
| Replacing the rim cylinder              | 5-10 |
| Replacing the spindle                   | 5-12 |
| Replacing cabinet cylinders             | 5-13 |
| Cam rotations for 1E Series cylinders   | 5-16 |
| Direct motion cabinet cylinders         | 5-16 |
| Lost motion cabinet cylinders           | 5-17 |

|                                       |      |
|---------------------------------------|------|
| Cam rotations for 5E Series cylinders | 5-18 |
| Lost motion C3 cam rotation           | 5-19 |
| Lost motion C4A cam rotation          | 5-20 |
| Lost motion C4B cam rotation          | 5-21 |
| Limited motion C1 cam rotation        | 5-22 |
| Limited motion C2A cam rotation       | 5-23 |
| Limited motion C2B cam rotation       | 5-24 |
| Troubleshooting                       | 5-25 |

### **E SERIES CAMS TABLE   A-1**

### **THUMBTURN CAM CONVERSION TABLE   B-1**

### **GLOSSARY   C-1**

### **INSTALLATION INSTRUCTIONS   D-1**

### **INDEX   E-1**



---

# FIGURES

## GETTING STARTED

E Series product family diagram 1-2

## PARTS FOR 1E SERIES

1E74 mortise cylinder exploded view 2-2  
1E72 rim cylinder exploded view 2-3  
1E7A4 thumbturn cylinder exploded view 2-4  
1E7D4 direct motion cabinet cylinder exploded view 2-5  
1E7E4 lost motion cabinet cylinder exploded view 2-6  
1E7B4 dust cover cylinder 2-7  
1E7C4 wrench-resistant cylinder 2-7  
1E7F4 lost motion cylinder 2-7  
1E7G4 hotel cylinder 2-8  
1E7K4 non-UL high security cylinder 2-8  
1E76 tapered-head cylinder 2-8  
1E02 rim cylinder dummy trim 2-9  
1E04 mortise cylinder dummy trim 2-9  
Standard cylinder rings 2-10  
Straight cylinder ring (1E-R708 shown) 2-11  
Wrench-resistant cylinder ring (1E-R808 shown) 2-12  
Mounting plates 2-13  
Tools 2-14

## PARTS FOR 3E SERIES

3E74 mortise cylinder exploded view 3-2  
Cylinder rings 3-3  
Tools 3-3

## PARTS FOR 5E SERIES

|   |     |
|---|-----|
| 5E7 lost motion cabinet cylinder exploded view    | 4-2 |
| 5E7 limited motion cabinet cylinder exploded view | 4-3 |
| Determining the cylinder ring length              | 4-4 |
| Cylinder ring (R708 shown)                        | 4-5 |
| Mounting plates                                   | 4-6 |
| Tools   | 4-6 |

## SERVICE AND MAINTENANCE

|   |      |
|---|------|
| Location of the cylinder set screw                                    | 5-2  |
| Removing the mortise cylinder   | 5-3  |
| Threading the set screw   | 5-4  |
| Back view of cam in 12 o'clock position                               | 5-4  |
| Reinstalling the mortise cylinder                                     | 5-5  |
| Location of the cylinder set screw (view from the edge of the door)   | 5-6  |
| Removing the cylinder ring (mortise cylinder shown)                   | 5-7  |
| Reinstalling the cylinder ring (mortise cylinder shown)               | 5-7  |
| Removing the cam  | 5-8  |
| Reinstalling the cam  | 5-9  |
| Removing the rim cylinder   | 5-10 |
| Figure-8 opening  | 5-11 |
| Reinstalling the rim cylinder   | 5-11 |
| Removing the spindle  | 5-12 |
| Reinstalling the spindle  | 5-12 |
| Securing the spindle  | 5-12 |
| Location of cam screws (5E Series cylinder assembly shown)            | 5-13 |
| Reinstalling the cabinet cylinder (5E Series cylinder assembly shown) | 5-15 |
| Groove pins installed for limited motion rotations                    | 5-18 |
| Groove pins installed for lost motion rotations                       | 5-18 |
| 5E Series lost motion C3 cam rotation                                 | 5-19 |
| 5E Series lost motion 4A cam rotation                                 | 5-20 |
| 5E Series lost motion 4B cam rotation                                 | 5-21 |
| 5E Series limited motion C1 cam rotation                              | 5-22 |
| 5E Series limited motion C2A cam rotation                             | 5-23 |
| 5E Series limited motion C2B cam rotation                             | 5-24 |

## THUMBTURN CAM CONVERSION TABLE

|   |     |
|---|-----|
| C4 standard cam and equivalent C140 thumbturn cam | B-2 |
|---|-----|



# 1

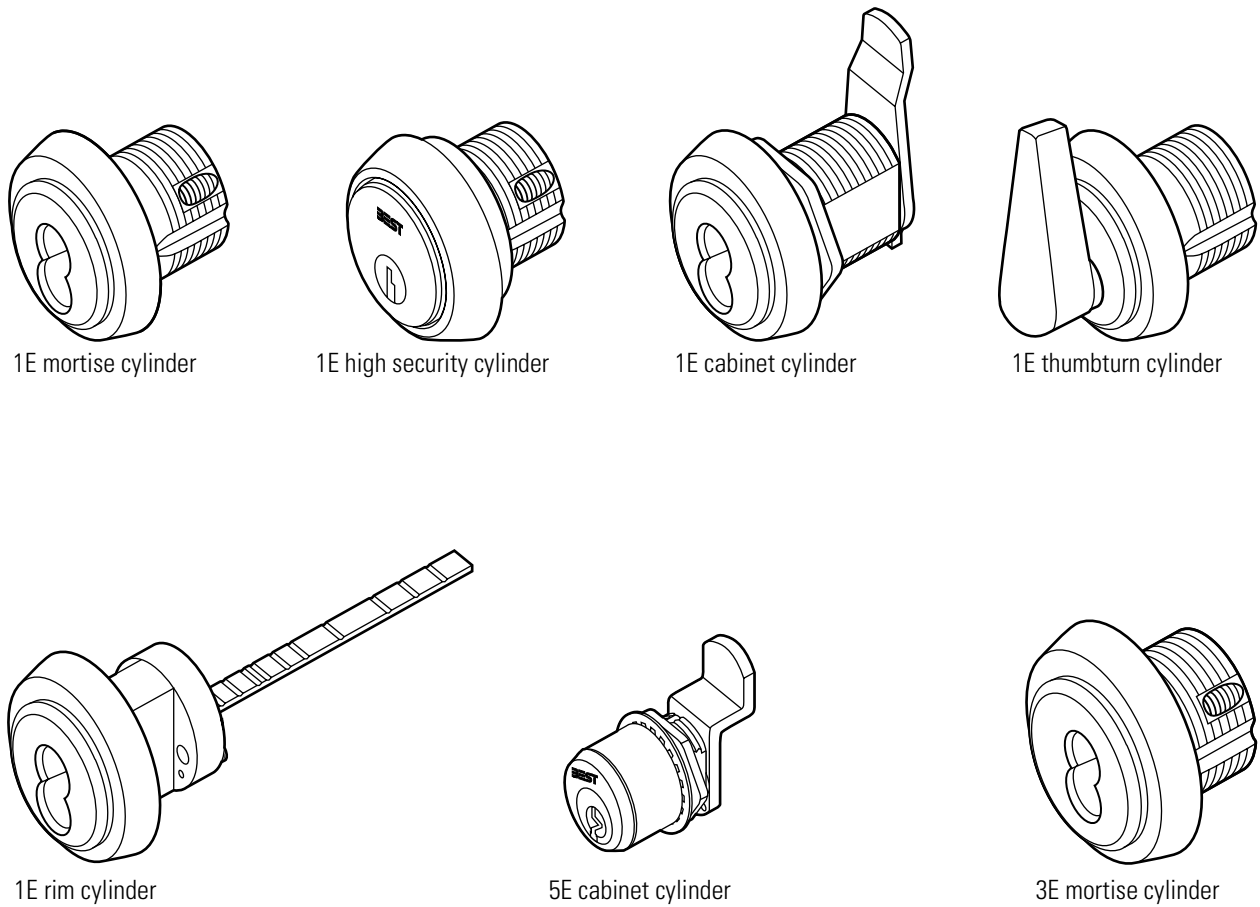
---

## GETTING STARTED

### INTRODUCTION

The *E Series Service Manual* contains essential information to help you maintain your E Series product. This manual includes information for 1E Series, 3E Series, and 5E Series 7-pin cylinder products only.

## PRODUCT FAMILY DIAGRAM



**Figure 1.1** E Series product family diagram

## CERTIFICATIONS AND STANDARDS

- The 1E7J4 high security cylinder is listed by Underwriter's Laboratories when used with 36H/37H mortise locks.
- The 1E74 mortise cylinder complies with ANSI/BHMA, Grade 2 standards when used with 30H Series mortise locks and the 1CD core.
- The 1E74 mortise cylinder complies with ANSI/BHMA, Grade 3 standards when used with the standard 1C core.

## DOCUMENTATION PACKAGE

The following resources are available to help you with the installation, start-up, and maintenance of your BEST E Series product.

These documents can be ordered separately from the product:

| Documentation Title  | Doc. No. |
|--|----------|
| <i>BEST Installation Instructions for 1E Mortise Cylinders</i> | T61781   |
| <i>BEST Installation Instructions for 1E Rim Cylinders</i>     | T61971   |
| <i>H Series Service Manual</i>                                 | T61964   |
| <i>Best Adaptation &amp; Equivalent List (8th edition)</i>     | B120-1   |
| <i>Core and Key Service Manual</i>                             | T35527   |

## TECHNICAL SUPPORT

### Support services

When you have a problem with an E Series product, your first resource for help is the *E Series Service Manual*. If you cannot find a satisfactory answer, contact your local BEST Representative.

### Telephone and web technical support

A factory-trained Certified Product Specialist (CPS) is available in your area whenever you need help. Before you call, however, please make sure you are where the E Series product is, and that you are prepared to give the following information:

- what happened and what you were doing when the problem arose
- what you have done so far to solve the problem.

Best Access Systems Representatives provide telephone technical support for all E Series products. You may locate the representative nearest you by calling (317) 849-2250 Monday through Friday, between 7:00 a.m. and 4:00 p.m. eastern standard time; or visit the web site, [www.BestAccess.com](http://www.BestAccess.com).



# 2

---

## PARTS FOR 1E SERIES

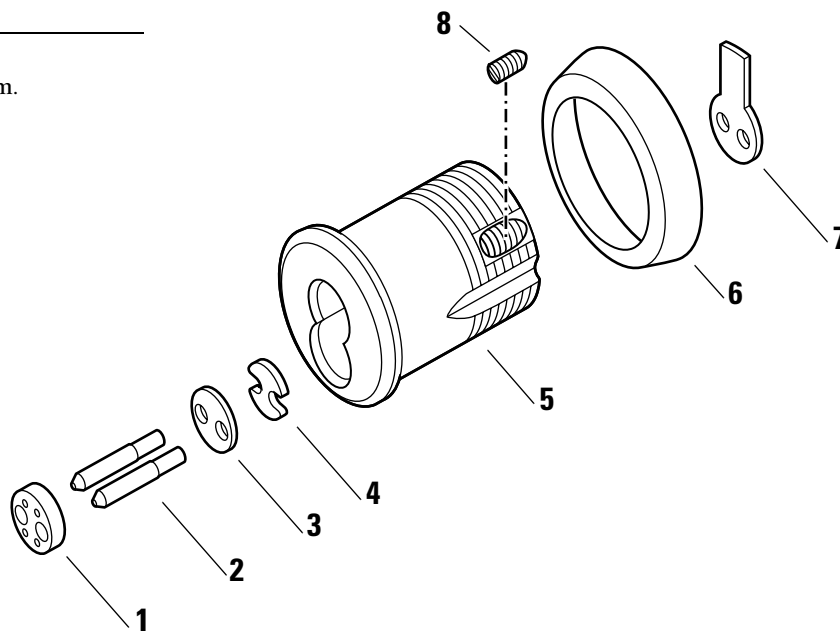
The following pages contain exploded diagrams that show all field serviceable parts for common 1E Series mortise, rim, and cabinet cylinders. This chapter also contains diagrams of special application mortise cylinders, diagrams of trim and other miscellaneous parts, and diagrams of common cams.

## EXPLODED DIAGRAMS AND PARTS LISTS

### MORTISE CYLINDER

| Item | Part no.                      | Qty. | Description                 |
|------|-------------------------------|------|-----------------------------|
| 1    | A06831                        | 1    | Spacer for 6-pin cores      |
| 2    | A40095                        | 2    | Throw pin                   |
| 3    | A10390                        | 1    | Throw plug                  |
| 4    | A10391                        | 1    | Stamped head                |
| 5    | C34075                        | 1    | 7-pin cylinder              |
| 6    | See <a href="#">page 2-10</a> | 1    | Cylinder ring               |
| 7    | See <a href="#">page 2-15</a> | 1    | Cam <sup>†</sup> (C4 shown) |
| 8    | A34123                        | 1    | Set screw                   |

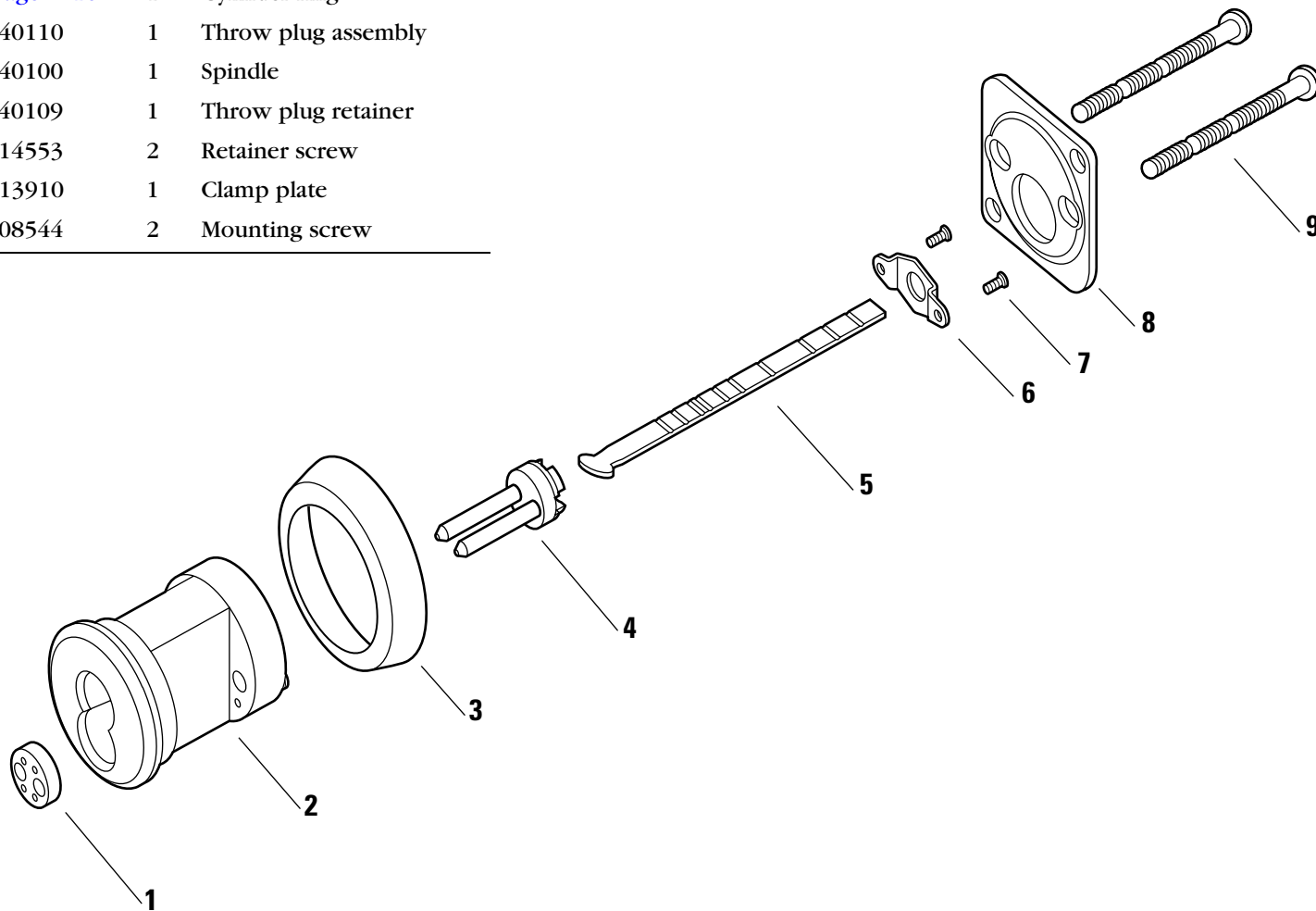
† Specify cylinder length when ordering cams.  
Cylinders 2 inches or longer require a thumbturn cam.  
See *Appendix B* for available thumbturn cams.



**Figure 2.1** 1E74 mortise cylinder exploded view

## RIM CYLINDER

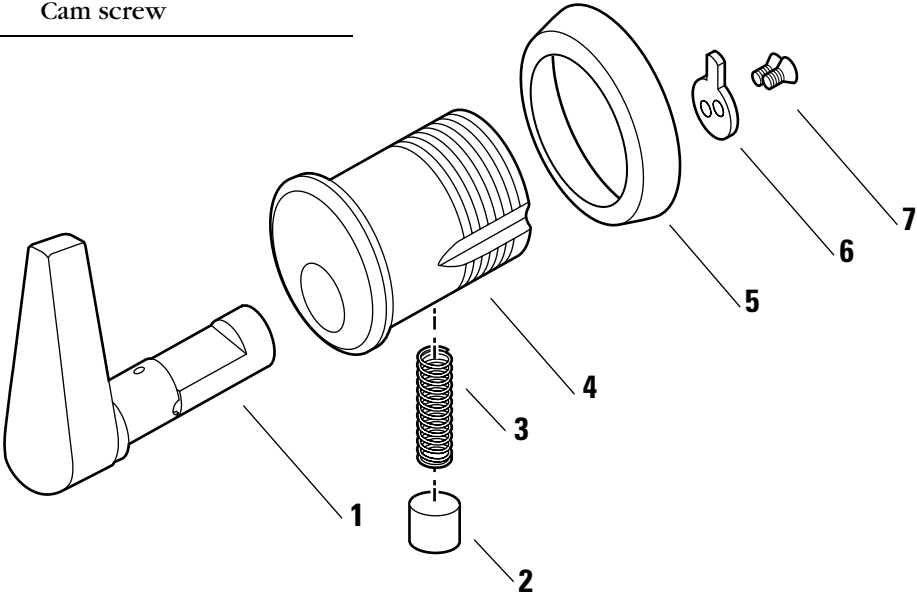
| Item | Part no.                      | Qty. | Description            |
|------|-------------------------------|------|------------------------|
| 1    | A06831                        | 1    | Spacer for 6-pin cores |
| 2    | C00121                        | 1    | 7-pin cylinder         |
| 3    | See <a href="#">page 2-10</a> | 1    | Cylinder ring          |
| 4    | A40110                        | 1    | Throw plug assembly    |
| 5    | A40100                        | 1    | Spindle                |
| 6    | B40109                        | 1    | Throw plug retainer    |
| 7    | A14553                        | 2    | Retainer screw         |
| 8    | C13910                        | 1    | Clamp plate            |
| 9    | A08544                        | 2    | Mounting screw         |



**Figure 2.2** 1E72 rim cylinder exploded view

# THUMBTURN CYLINDER

| Item      | Part no.                      | Qty. | Description       |
|-----------|-------------------------------|------|-------------------|
| 1         | B61572                        | 1    | ADA thumbturn     |
| not shown | A24046                        | 1    | Non-ADA thumbturn |
| 2         | A03612                        | 1    | Spring plug       |
| 3         | A18033                        | 1    | Spring            |
| 4         | B04781                        | 1    | 7-pin cylinder    |
| 5         | See <a href="#">page 2-10</a> | 1    | Cylinder ring     |
| 6         | See <a href="#">page B-2</a>  | 1    | Cam (C413 shown)  |
| 7         | A04838                        | 2    | Cam screw         |



**Figure 2.3** 1E7A4 thumbturn cylinder exploded view



DIRECT MOTION CABINET CYLINDER

| Item | Part no.                      | Qty. | Description                   |
|------|-------------------------------|------|-------------------------------|
| 1    | A06831                        | 1    | Spacer for 6-pin cores        |
| 2    | A00539                        | 2    | Throw pin                     |
| 3    | A07544                        | 1    | Throw plug                    |
| 4    | B07547                        | 1    | 7-pin cylinder                |
| 5    | See <a href="#">page 2-10</a> | 1    | Cylinder ring                 |
| 6    | A00836                        | 1    | Nut                           |
| 7    | A04460                        | 1    | Throw plug retainer           |
| 8    | See <a href="#">page 2-20</a> | 1    | Cam <sup>†</sup> (C228 shown) |
| 9    | A07542                        | 2    | Cam screw                     |

<sup>†</sup> See [page 5-16](#) for cam rotations.

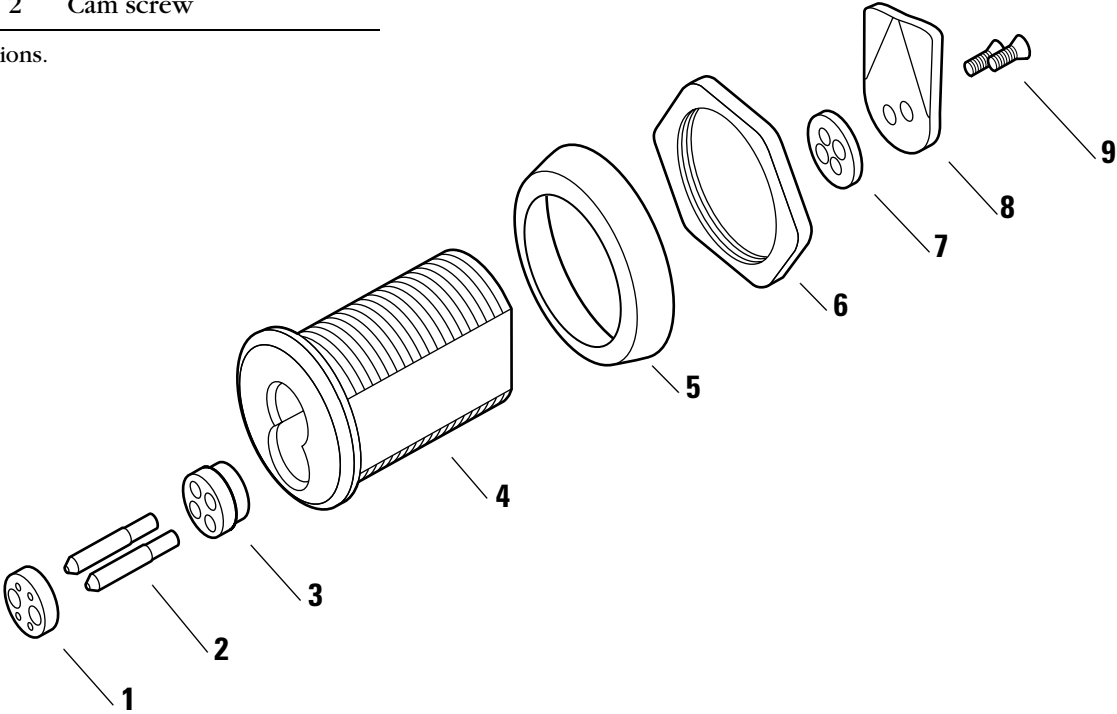
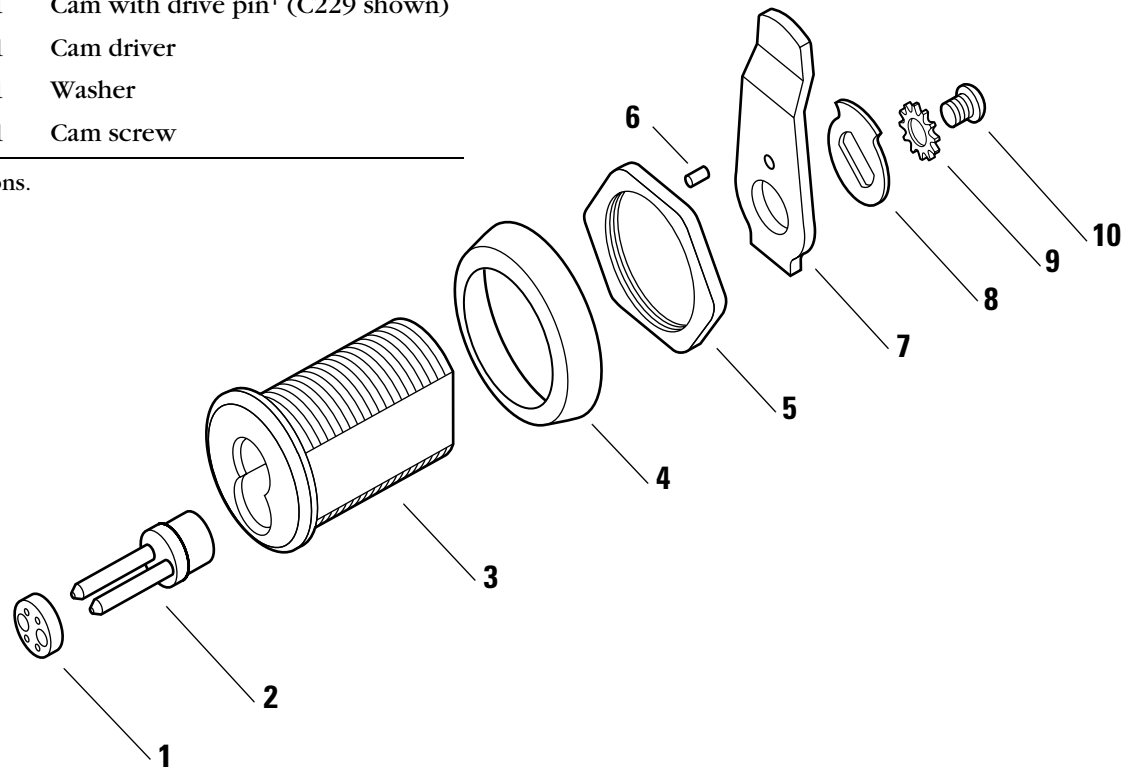


Figure 2.4 1E7D4 direct motion cabinet cylinder exploded view

# LOST MOTION CABINET CYLINDER

| Item | Part no.                      | Qty. | Description                                  |
|------|-------------------------------|------|--|
| 1    | A06831                        | 1    | Spacer for 6-pin cores                       |
| 2    | A07986                        | 1    | Throw member assembly                        |
| 3    | A07993                        | 1    | 7-pin cylinder                               |
| 4    | See <a href="#">page 2-10</a> | 1    | Cylinder ring                                |
| 5    | A00836                        | 1    | Nut  |
| 6    | B40412                        | 1    | Cam stop pin                                 |
| 7    | See <a href="#">page 2-20</a> | 1    | Cam with drive pin <sup>†</sup> (C229 shown) |
| 8    | A07988                        | 1    | Cam driver                                   |
| 9    | A07954                        | 1    | Washer                                       |
| 10   | A07956                        | 1    | Cam screw                                    |

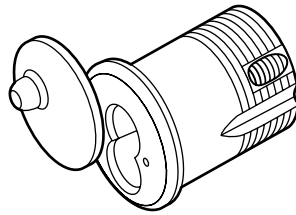
<sup>†</sup> See [page 5-17](#) for cam rotations.



**Figure 2.5** 1E7E4 lost motion cabinet cylinder exploded view

## SPECIAL MORTISE CYLINDER APPLICATIONS

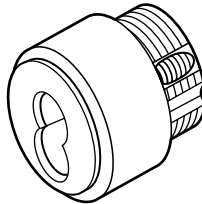
### Dust cover cylinder



**Figure 2.6** 1E7B4 dust cover cylinder

### Wrench-resistant cylinder

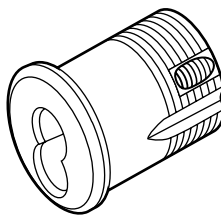
**Note:** See [page 2-12](#) for wrench-resistant cylinder rings.



**Figure 2.7** 1E7C4 wrench-resistant cylinder

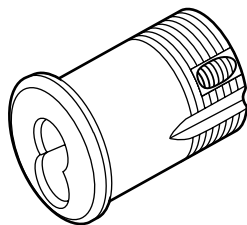
### Lost motion cylinder

**Note:** Specify cylinder handing when ordering (for example, “RHI” = right hand, inside door).



**Figure 2.8** 1E7F4 lost motion cylinder

### Hotel shifting cam cylinder

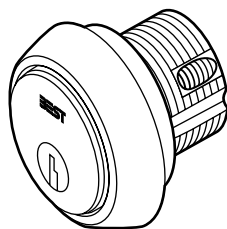


**Figure 2.9** 1E7G4 hotel cylinder

### Non-UL high security cylinder

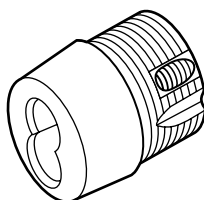
**Note:** To order the 1E7J4 high security cylinder listed by Underwriters Laboratories (UL), contact your BEST Representative.

**Note:** High security cylinders require long blade keys for operation.



**Figure 2.10** 1E7K4 non-UL high security cylinder

### Tapered-head cylinder



**Figure 2.11** 1E76 tapered-head cylinder

TRIM PARTS

Rim dummy trim

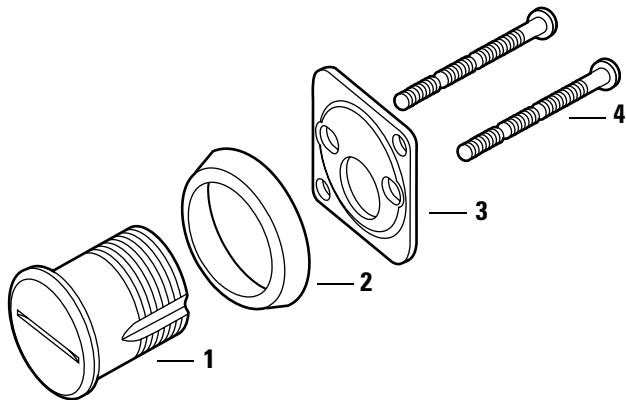


Figure 2.12 1E02 rim cylinder dummy trim

Rim dummy trim parts list

| Item | Part no.                      | Qty. | Description    |
|------|-------------------------------|------|----------------|
| 1    | A05032                        | 1    | Dummy cylinder |
| 2    | See <a href="#">page 2-10</a> | 1    | Cylinder ring  |
| 3    | C13910                        | 1    | Clamp plate    |
| 4    | A08544                        | 2    | Mounting screw |

Mortise dummy trim

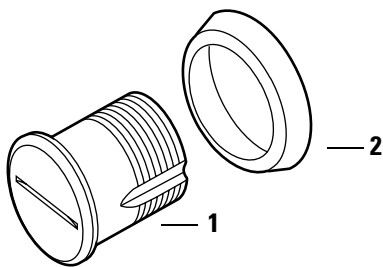


Figure 2.13 1E04 mortise cylinder dummy trim

Mortise dummy trim parts list

| Item <sup>†</sup> | Part no.                      | Qty. | Description    |
|-------------------|-------------------------------|------|----------------|
| 1                 | A05032                        | 1    | Dummy cylinder |
| 2                 | See <a href="#">page 2-10</a> | 1    | Cylinder ring  |

<sup>†</sup> The C13910 clamp plate and two A08544 mounting screws for rim dummy trim applications are also included in the mortise dummy trim package.

Stamped  
cylinder rings

A cylinder ring is required if there is a gap between the cylinder head and the mounting surface when the cam is positioned for proper lock operation. Stamped cylinder rings may be stacked, if necessary, for some door applications.

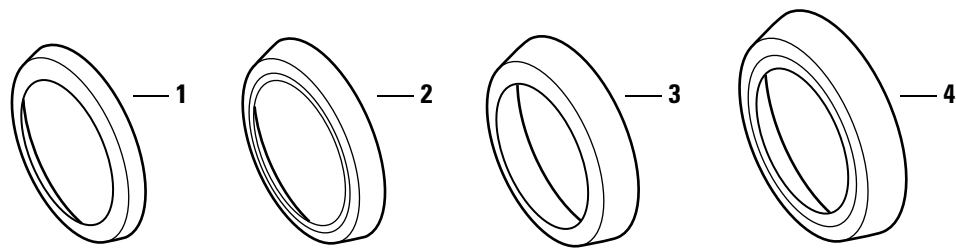


Figure 2.14 Standard cylinder rings

Stamped cylinder rings parts list

| Item | Nomen-<br>clature | Part no. | Length |
|------|-------------------|----------|--------|
| 1    | 1E-R2             | A40102   | 1/8"   |
| 2    | 1E-R3             | A40103   | 3/16"  |
| 3    | 1E-R4             | A40104   | 1/4"   |
| 4    | 1E-R5             | A40105   | 3/8"   |

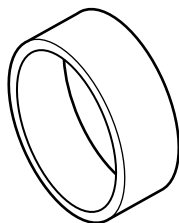
Stamped cylinder  
ring packages

| Nomen-<br>clature | Rings included                         |
|-------------------|--|
| RP <sup>†</sup>   | 1E-R3—3/16"<br>1E-R5—3/8"              |
| RP1               | 1E-R2—1/8"<br>1E-R3—3/16"              |
| RP2               | 1E-R2—1/8"<br>1E-R4—1/4"               |
| RP3 <sup>‡</sup>  | 1E-R2—1/8"<br>1E-R4—1/4"<br>1E-R5—3/8" |

† Supplied standard with 7-pin rim cylinders.

‡ Supplied standard with 7-pin mortise cylinders.

## Straight cylinder rings

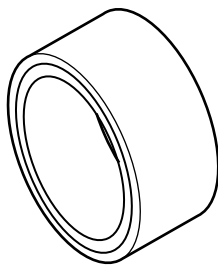


**Figure 2.15** Straight cylinder ring (1E-R708 shown)

### Straight cylinder ring part numbers

| Nomen-<br>clature | Part no. | Length |
|-------------------|----------|--------|
| 1E-R702           | A06280   | 1/8"   |
| 1E-R703           | A06281   | 3/16"  |
| 1E-R704           | A06282   | 1/4"   |
| 1E-R705           | A04370   | 5/16"  |
| 1E-R706           | A06283   | 3/8"   |
| 1E-R707           | A06284   | 7/16"  |
| 1E-R708           | A06285   | 1/2"   |
| 1E-R709           | A04369   | 9/16"  |
| 1E-R710           | A06286   | 5/8"   |
| 1E-R711           | A06288   | 11/32" |
| 1E-R712           | A06287   | 3/4"   |

## Wrench-resistant cylinder rings



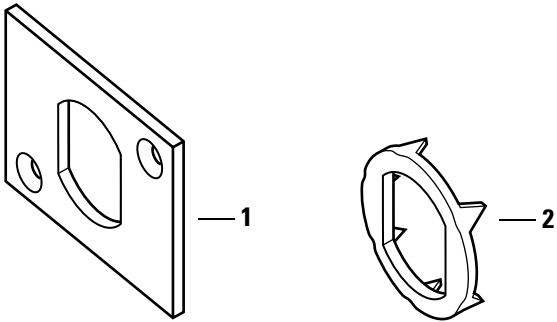
**Figure 2.16** Wrench-resistant cylinder ring (1E-R808 shown)

### Wrench-resistant cylinder ring part numbers

| Nomen-<br>clature | Part no. | Length |
|-------------------|----------|--------|
| 1E-R802           | A05963   | 1/8"   |
| 1E-R803           | A05958   | 3/16"  |
| 1E-R804           | A05959   | 1/4"   |
| 1E-R805           | A05960   | 5/16"  |
| 1E-R806           | A05961   | 3/8"   |
| 1E-R807           | A05962   | 7/16"  |
| 1E-R808           | A05957   | 1/2"   |
| 1E-R809           | A05964   | 9/16"  |
| 1E-R810           | A05965   | 5/8"   |
| 1E-R811           | A05966   | 11/16" |
| 1E-R812           | A05967   | 3/4"   |
| 1E-R814           | A05969   | 13/16" |
| 1E-R815           | A05970   | 7/8"   |
| 1E-R816           | A05971   | 15/16" |



**Mounting plates**      The following mounting plates can be used with 1E7D4 and 1E7E4 cabinet cylinders.

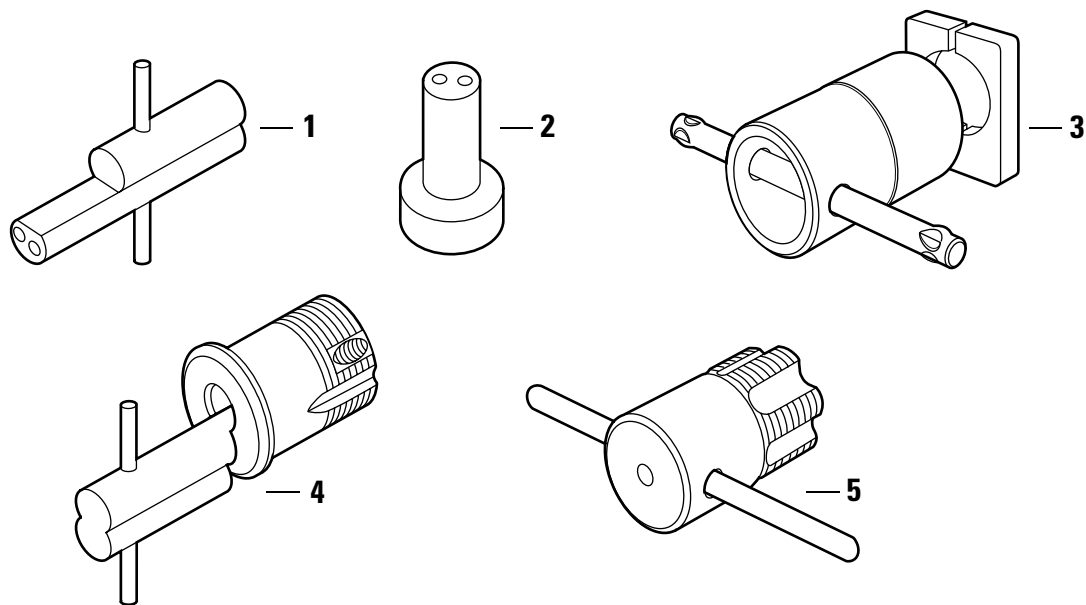


**Figure 2.17** Mounting plates

**Mounting plates part numbers**

| Item | Part no. | Description          |
|------|----------|----------------------|
| 1    | A14543   | Large mounting plate |
| 2    | A20361   | Wood mounting plate  |

**Tools**    The following tools are used to install and service 1E Series cylinders.



**Figure 2.18** Tools

**Tools parts list**

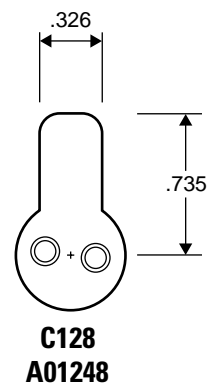
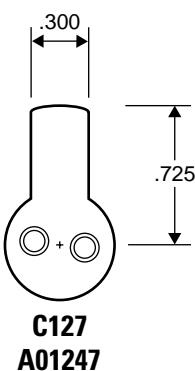
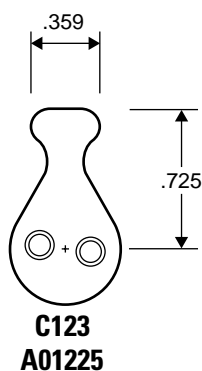
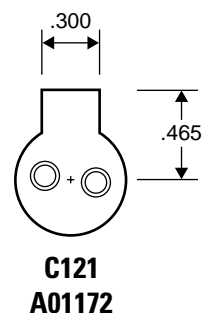
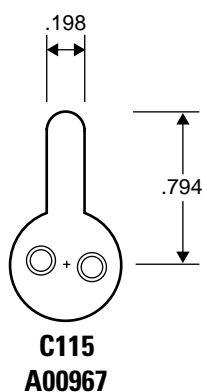
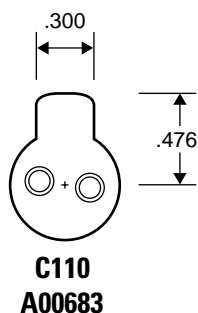
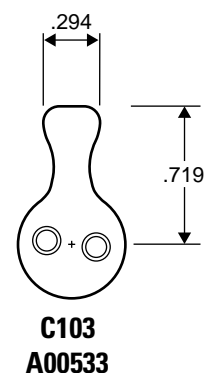
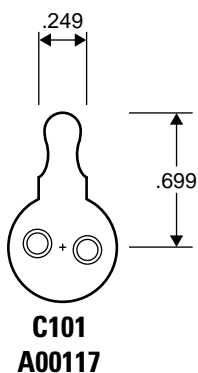
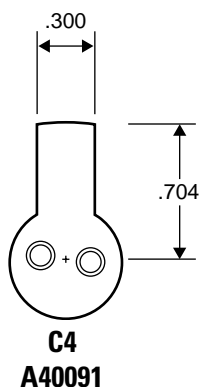
| Item | Nomen-<br>clature | Part no. | Description                        | Use   |
|------|-------------------|----------|------------------------------------|---|
| 1    | ED211             | A09612   | Mortise cylinder wrench            | Tool for installing, removing, and testing cylinders                |
| 2    | ED212             | A19370   | Mortise cylinder cam assembly tool | Tool for assembling cams to mortise cylinders                       |
| 3    | ED221             | A06206   | Mortise cylinder thread repair die | Tool for rethreading 1 5/32" cylinders                              |
| 4    | ED222             | A06399   | Cylinder cam testing tool          | Tool for testing the functionality of cams when installed in a door |
| 5    | ED225             | A01474   | 1E cylinder hole tap               | Tool for rethreading case threads                                   |

## CAM IDENTIFICATION

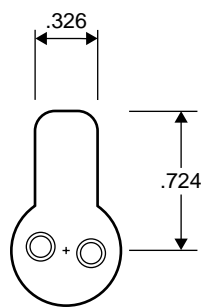
The following common cams are grouped by shape and then sorted by cam number, listing dimensions in inches for each. All cams are shown approximately their size. See *Appendix A Cams Table* for a table of E Series cams listed by part number.

**Note:** Specify “1E” when ordering cams separately (for example, “1E-C4”).

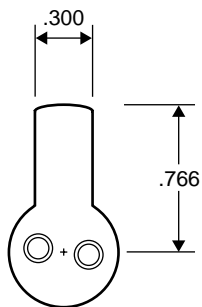
### Straight cams



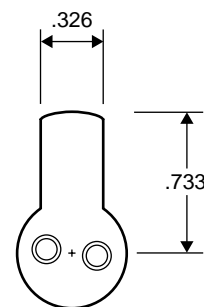
Straight cams cont'd.



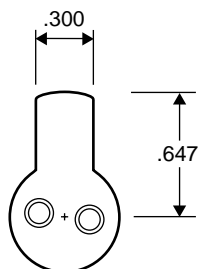
**C129**  
**A01249**



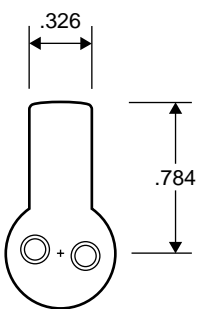
**C130**  
**A01400**



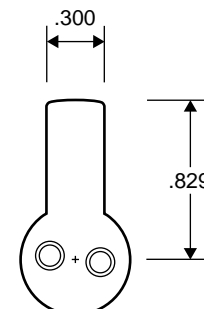
**C131**  
**A01401**



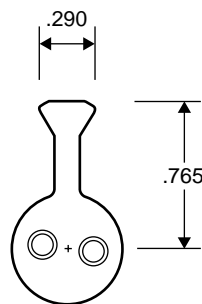
**C134**  
**A01414**



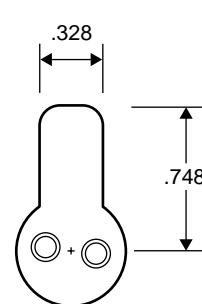
**C136**  
**A01416**



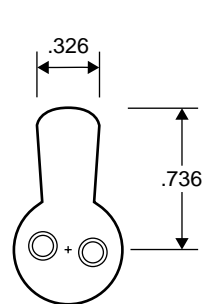
**C137**  
**A01417**



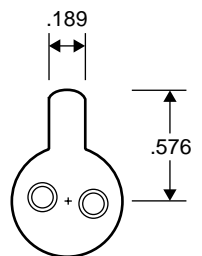
**C143**  
**A01487**



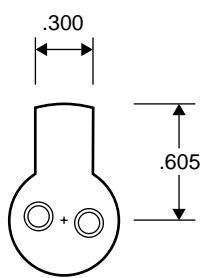
**C152**  
**A01799**



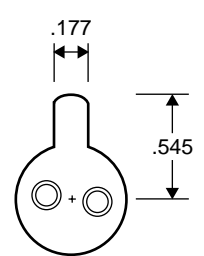
**C162**  
**A04387**



**C165**  
**A04399**

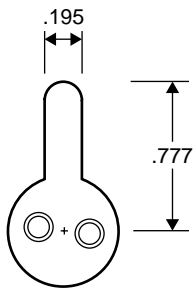


**C169**  
**A04445**

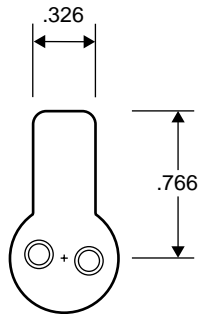


**C171**  
**A04492**

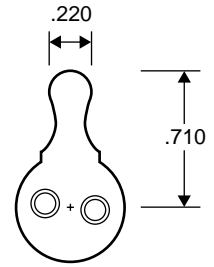
## Straight cams cont'd.



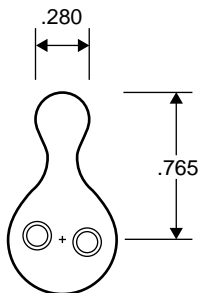
**C173**  
**B04796**



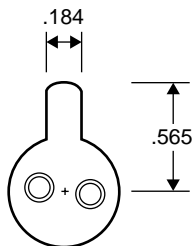
**C177**  
**A05397**



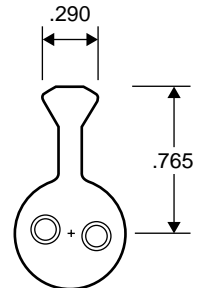
**C178**  
**A05466**



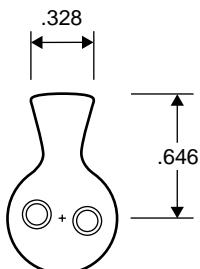
**C179**  
**B05467**



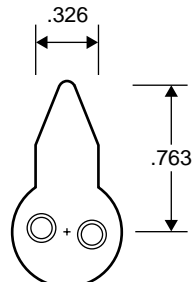
**C181**  
**A05979**



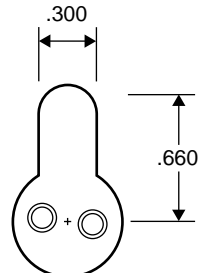
**C182**  
**A05989**



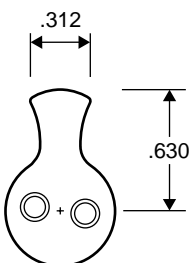
**C185**  
**A06060**



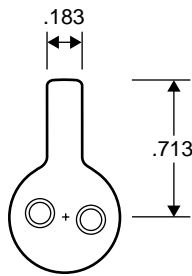
**C186**  
**A06190**



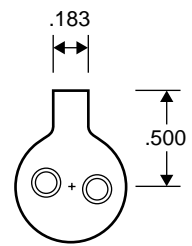
**C191**  
**A06419**



**C193**  
**A07190**

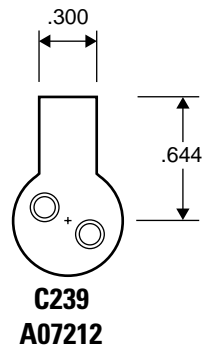
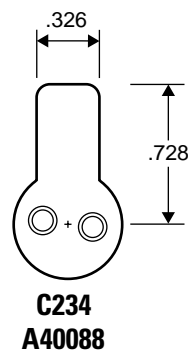
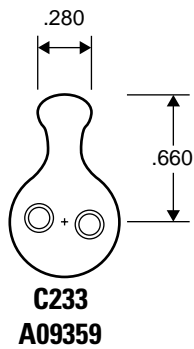
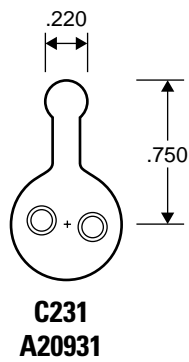
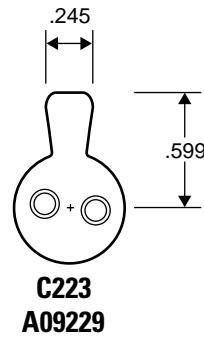
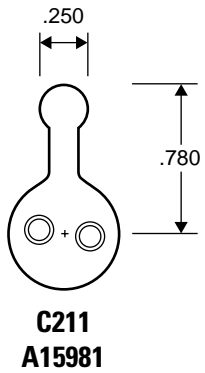
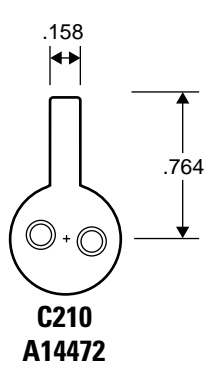


**C208**  
**A14520**

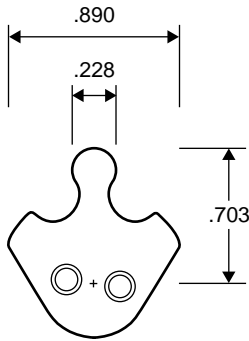


**C209**  
**A14521**

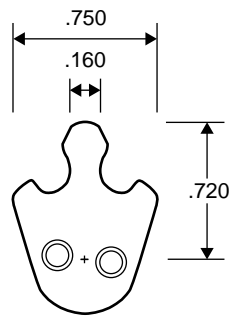
Straight cams cont'd.



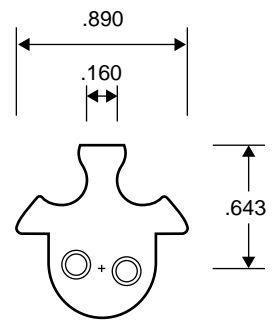
## Cloverleaf cams



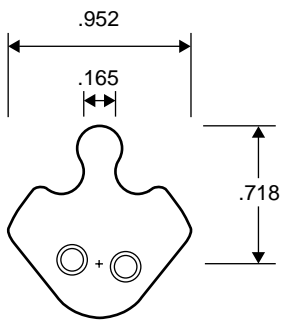
**C118**  
**A00995**



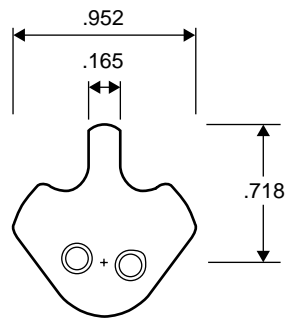
**C161**  
**A02770**



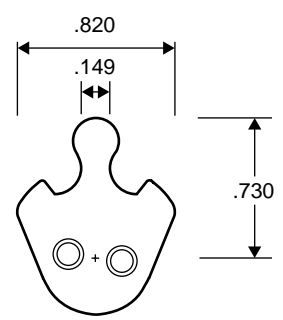
**C204**  
**A07880**



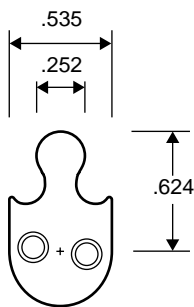
**C222**  
**A20877**



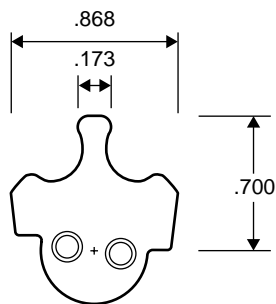
**C256**  
**A23770**



**C258**  
**B34077**

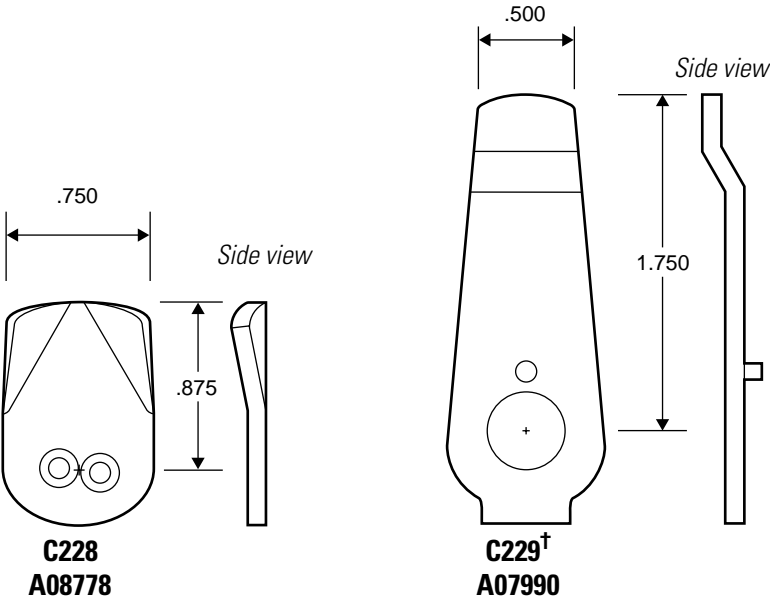
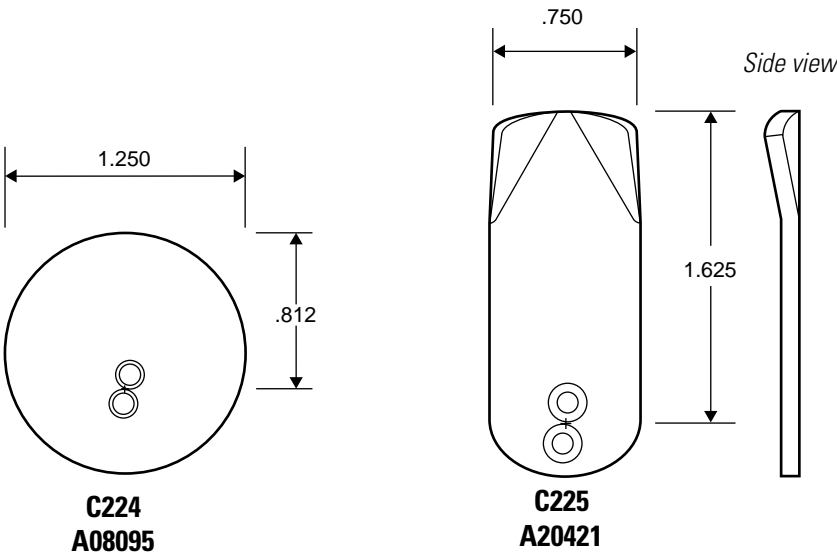


**C265**  
**B39256**



**C281**  
**B34562**

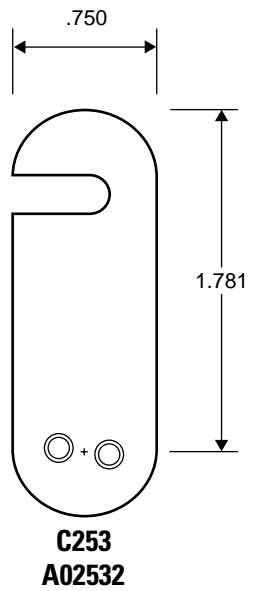
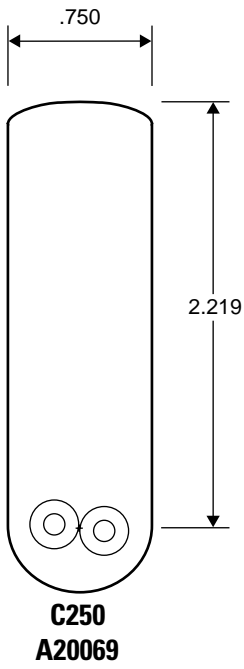
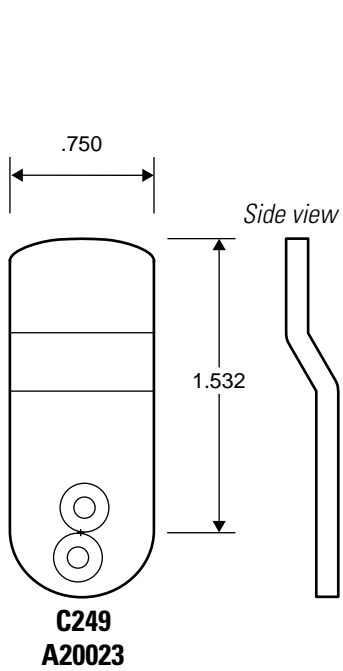
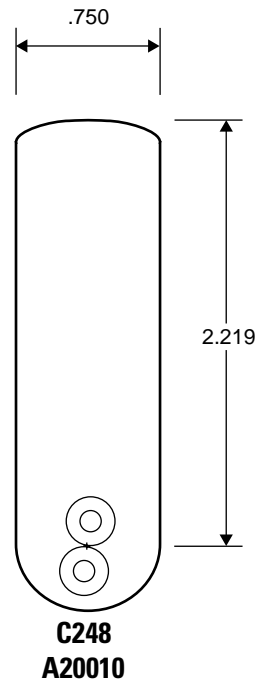
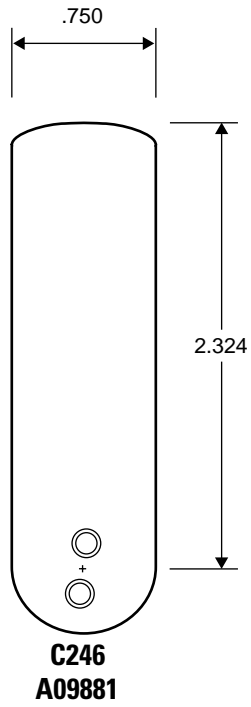
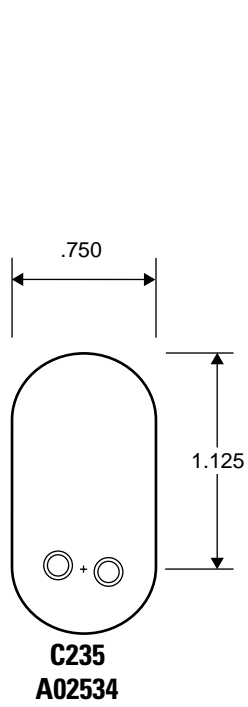
Cabinet cams



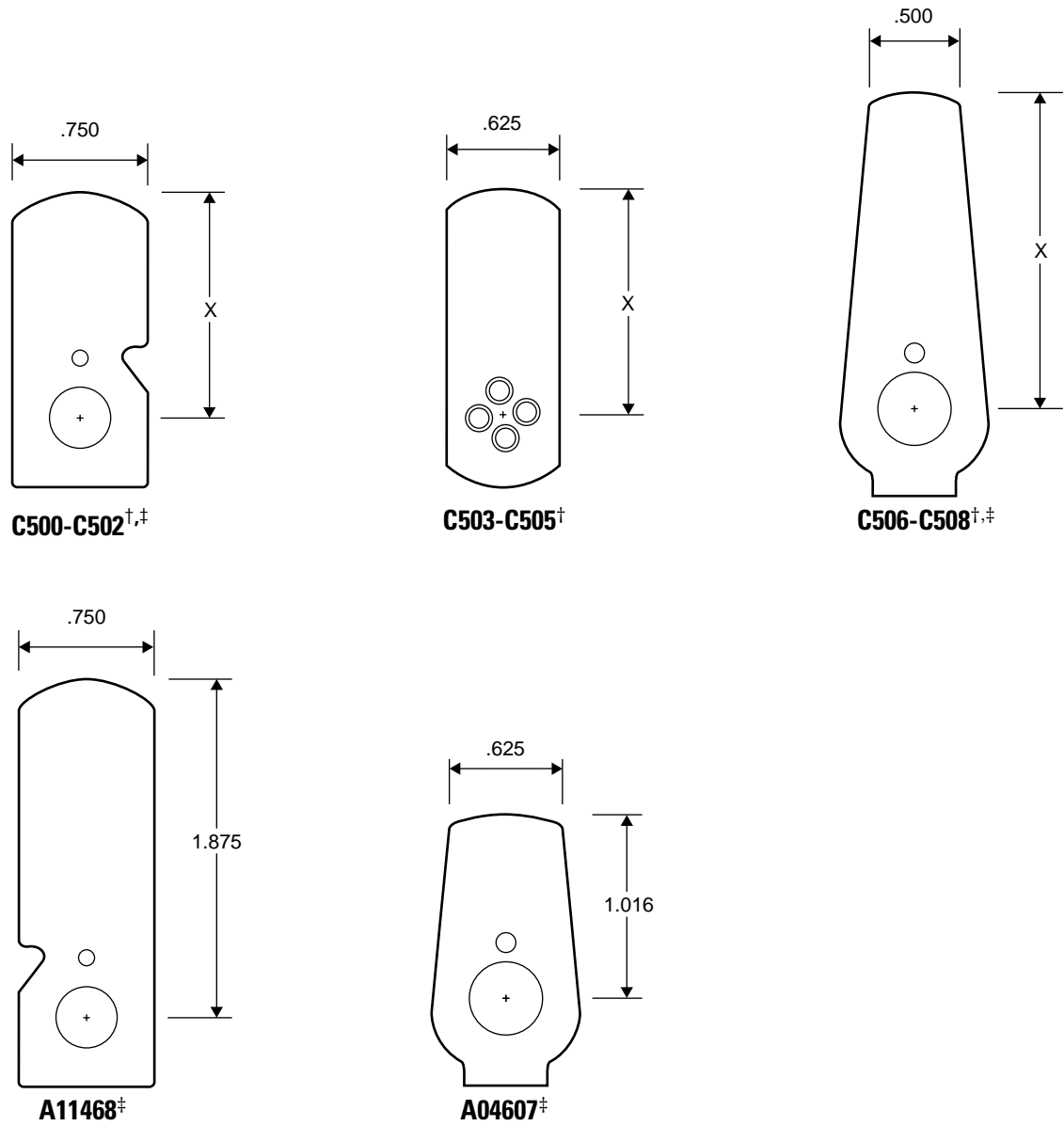
† Drive pin location shown.



Cabinet cams cont'd.



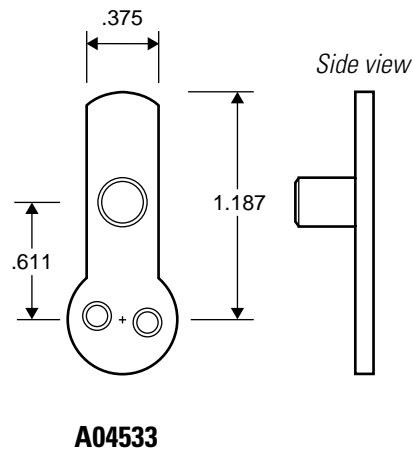
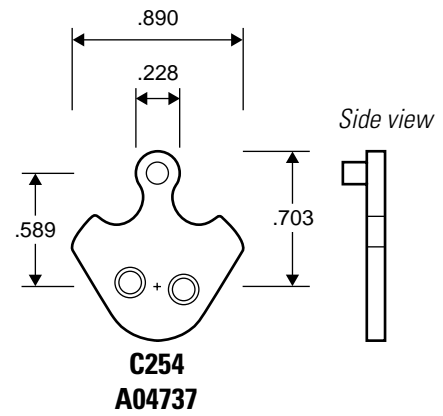
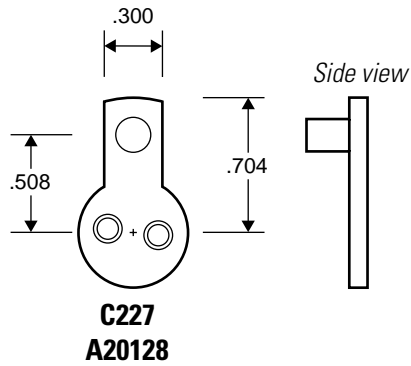
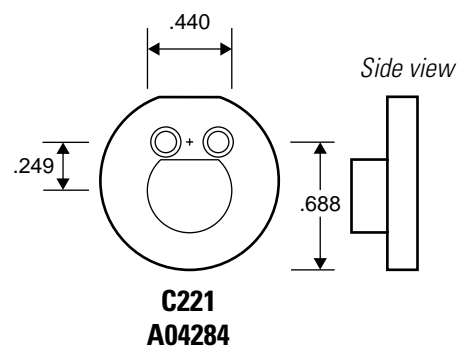
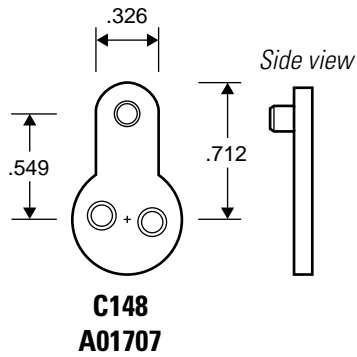
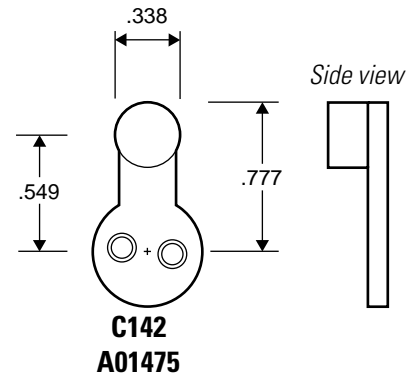
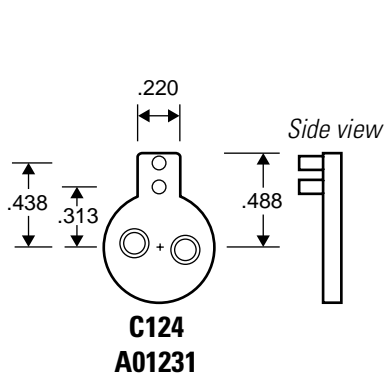
Cabinet cams cont'd.



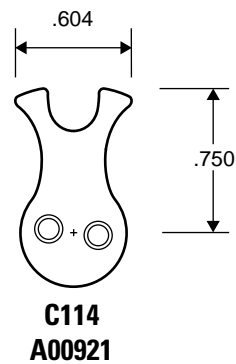
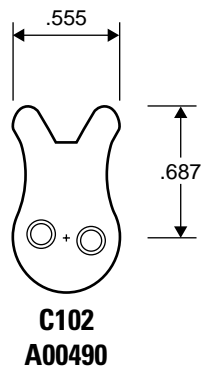
<sup>†</sup> Specify cam length "X" when ordering. See the table below. See [page 5-16](#) for 1E Series cam rotations.  
<sup>‡</sup> Drive pin hole location shown.

| Cam  | Part No. | Length "X" |
|------|----------|------------|
| C500 | A63060   | 1 1/8"     |
| C501 | A63061   | 1 1/2"     |
| C502 | A63062   | 2 1/4"     |
| C503 | A63063   | 1 1/8"     |
| C504 | A63064   | 1 1/2"     |
| C505 | A63065   | 2 1/4"     |
| C506 | A63066   | 1 1/8"     |
| C507 | A63067   | 1 1/2"     |
| C508 | A63068   | 2 1/4"     |

## Roller cams



Two-point cams



# 3

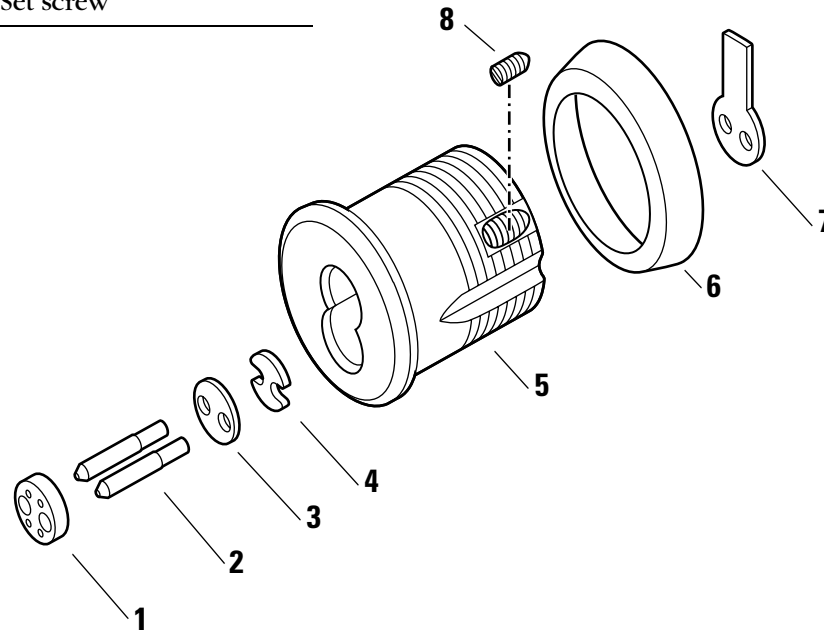
---

## PARTS FOR 3E SERIES

The following pages contain an exploded diagram showing all field serviceable parts for the 3E Series mortise cylinder, diagrams of trim and other miscellaneous parts, and diagrams of common cams.

## MORTISE CYLINDER EXPLODED DIAGRAM AND PARTS LIST

| Item | Part no.                     | Qty. | Description            |
|------|------------------------------|------|------------------------|
| 1    | A06831                       | 1    | Spacer for 6-pin cores |
| 2    | A40095                       | 2    | Throw pin              |
| 3    | A10390                       | 1    | Throw plug             |
| 4    | A10391                       | 1    | Stamped head           |
| 5    | C40090                       | 1    | 7-pin cylinder         |
| 6    | See <a href="#">page 3-3</a> | 1    | Cylinder ring          |
| 7    | See <a href="#">page 3-4</a> | 1    | Cam (C3 shown)         |
| 8    | A34123                       | 1    | Set screw              |



**Figure 3.1** 3E74 mortise cylinder exploded view

TRIM PARTS

Stamped  
cylinder rings

A cylinder ring is required if there is a gap between the cylinder head and the mounting surface when the cam is positioned for proper lock operation. Stamped cylinder rings may be stacked, if necessary, for some door applications.

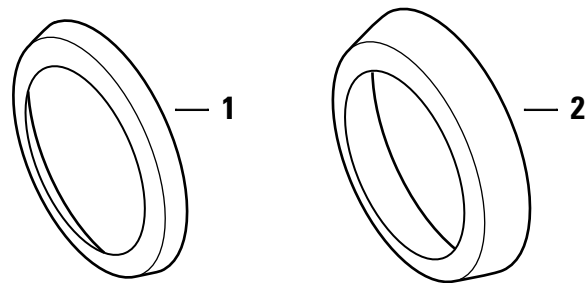


Figure 3.2 Cylinder rings

Cylinder rings parts list

| Item      | Nomen-<br>clature | Part no. | Length |
|-----------|-------------------|----------|--------|
| 1         | 3E-R2             | A40106   | 1/8"   |
| 2         | 3E-R4             | A40107   | 1/4"   |
| not shown | 3E-R8             | A09198   | 3/8"   |

Tools

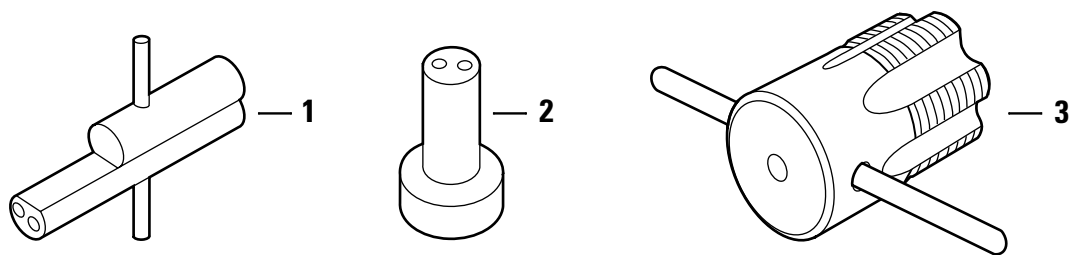


Figure 3.3 Tools

Tools parts list

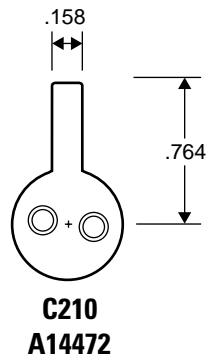
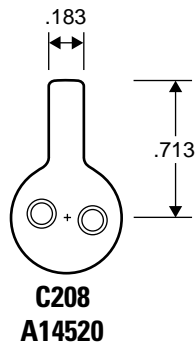
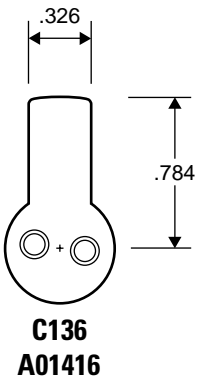
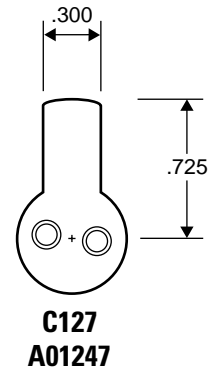
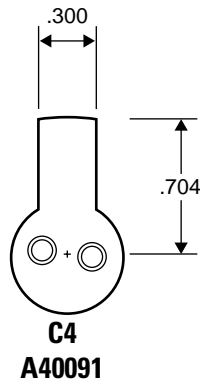
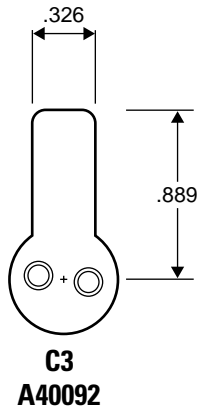
| Item | Nomen-<br>clature | Part no. | Description                        | Use  |
|------|-------------------|----------|------------------------------------|--|
| 1    | ED211             | A09612   | Mortise cylinder wrench            | Tool for installing, removing, and testing cylinders |
| 2    | ED212             | A19370   | Mortise cylinder cam assembly tool | Tool for assembling cams to mortise cylinders        |
| 3    | ED224             | A07861   | 3E cylinder hole tap               | Tool for rethreading case threads                    |

## CAM IDENTIFICATION

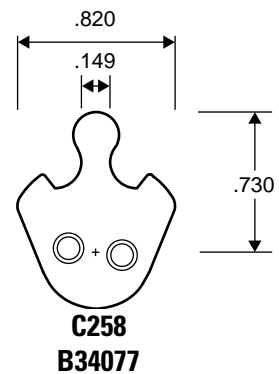
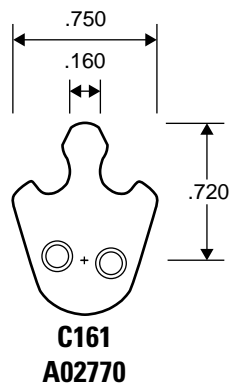
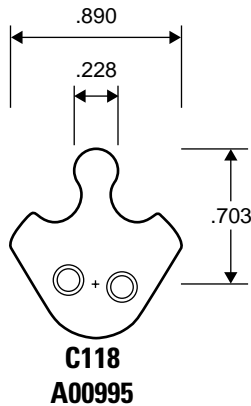
The following section shows common 3E cams and their dimensions in inches. Cams are shown approximately their size. See *Appendix A E Series Cams Table* for a list of E Series cams sorted by part number.

**Note:** Specify “3E” when ordering cams separately (for example, “3E-C3”).

### Straight cams

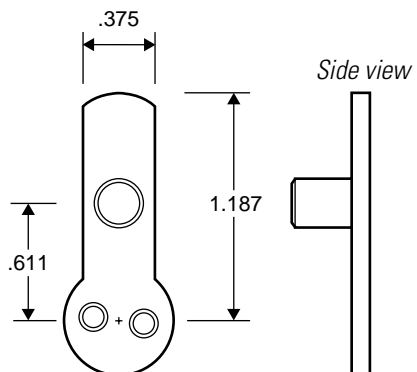


### Cloverleaf cams





## Roller cams



**A04533**



# 4

---

## PARTS FOR 5E SERIES

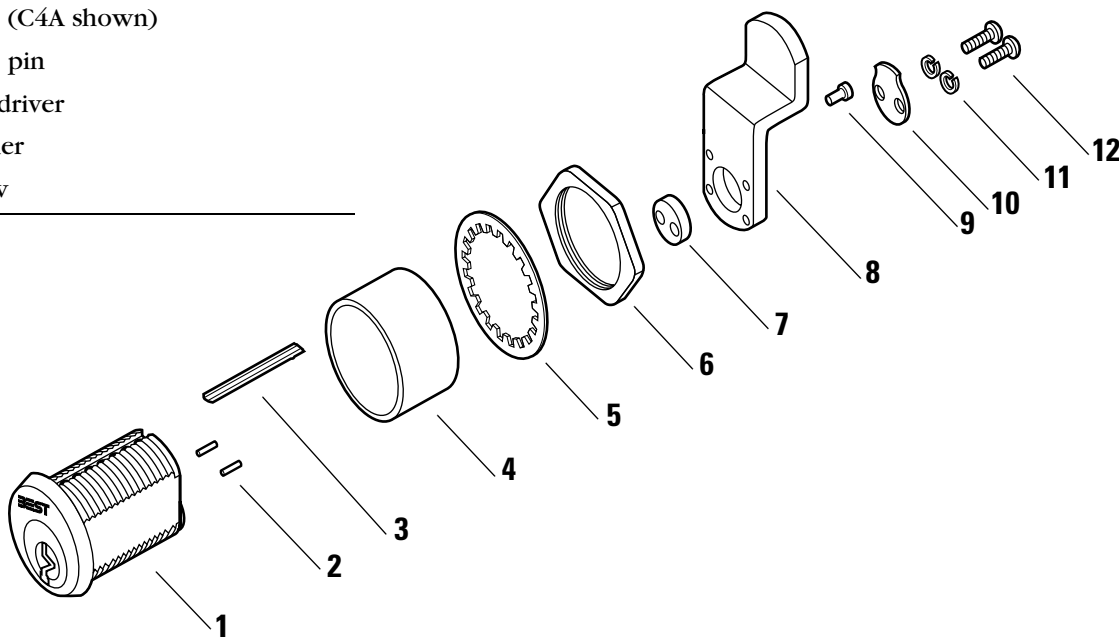
The following pages contain exploded diagrams showing all field serviceable parts for the 5E Series cylinders, diagrams of trim and other miscellaneous parts, and drawings of common cams.

## EXPLODED DIAGRAM AND PARTS LIST LOST MOTION CABINET CYLINDER

| Item | Part no.                     | Qty. | Description                                   |
|------|------------------------------|------|---|
| 1    | C10861                       | 1    | 7-pin cylinder and plug assembly <sup>†</sup> |
| 2    | A12350                       | 2    | Groove pin                                    |
| 3    | B10852                       | 1    | Slide cap for 7-pin cylinders                 |
| 4    | See <a href="#">page 4-5</a> | 1    | Cylinder ring                                 |
| 5    | A21068                       | 1    | Lock washer                                   |
| 6    | A08049                       | 1    | Nut   |
| 7    | A21150                       | 1    | Throw plug                                    |
| 8    | See <a href="#">page 4-7</a> | 1    | Cam <sup>‡</sup> (C4A shown)                  |
| 9    | A21099                       | 1    | Drive pin                                     |
| 10   | A21151                       | 1    | Cam driver                                    |
| 11   | A14045                       | 2    | Washer  |
| 12   | A04845                       | 2    | Screw   |

<sup>†</sup> Specify keyway when ordering.

<sup>‡</sup> See [page 5-18](#) for cam rotations.



**Figure 4.1** 5E7 lost motion cabinet cylinder exploded view

LIMITED MOTION CABINET CYLINDER

| Item | Part no.                     | Qty. | Description                                   |
|------|------------------------------|------|---|
| 1    | C10861                       | 1    | 7-pin cylinder and plug assembly <sup>†</sup> |
| 2    | A12350                       | 2    | Groove pin                                    |
| 3    | B10852                       | 1    | Slide cap for 7-pin cylinders                 |
| 4    | See <a href="#">page 4-5</a> | 1    | Cylinder ring                                 |
| 5    | A21068                       | 1    | Lock washer                                   |
| 6    | A08049                       | 1    | Nut   |
| 7a   | A21302                       | 1    | Stop plate (for 180° rotation) <i>OR</i>      |
| 7b   | A14065                       | 1    | Stop plate (for 90° rotation)                 |
| 8    | See <a href="#">page 4-7</a> | 1    | Cam <sup>‡</sup> (C1 shown)                   |
| 9    | A14045                       | 2    | Washer  |
| 10   | A04845                       | 2    | Screw   |

<sup>†</sup> Specify keyway when ordering.

<sup>‡</sup> See [page 5-22](#) for cam rotations.

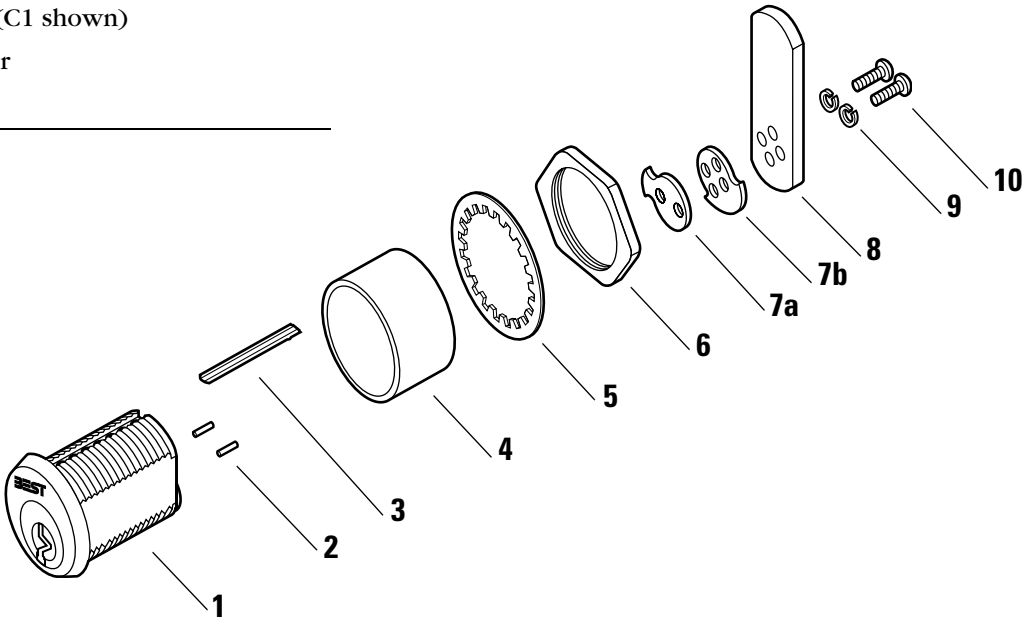


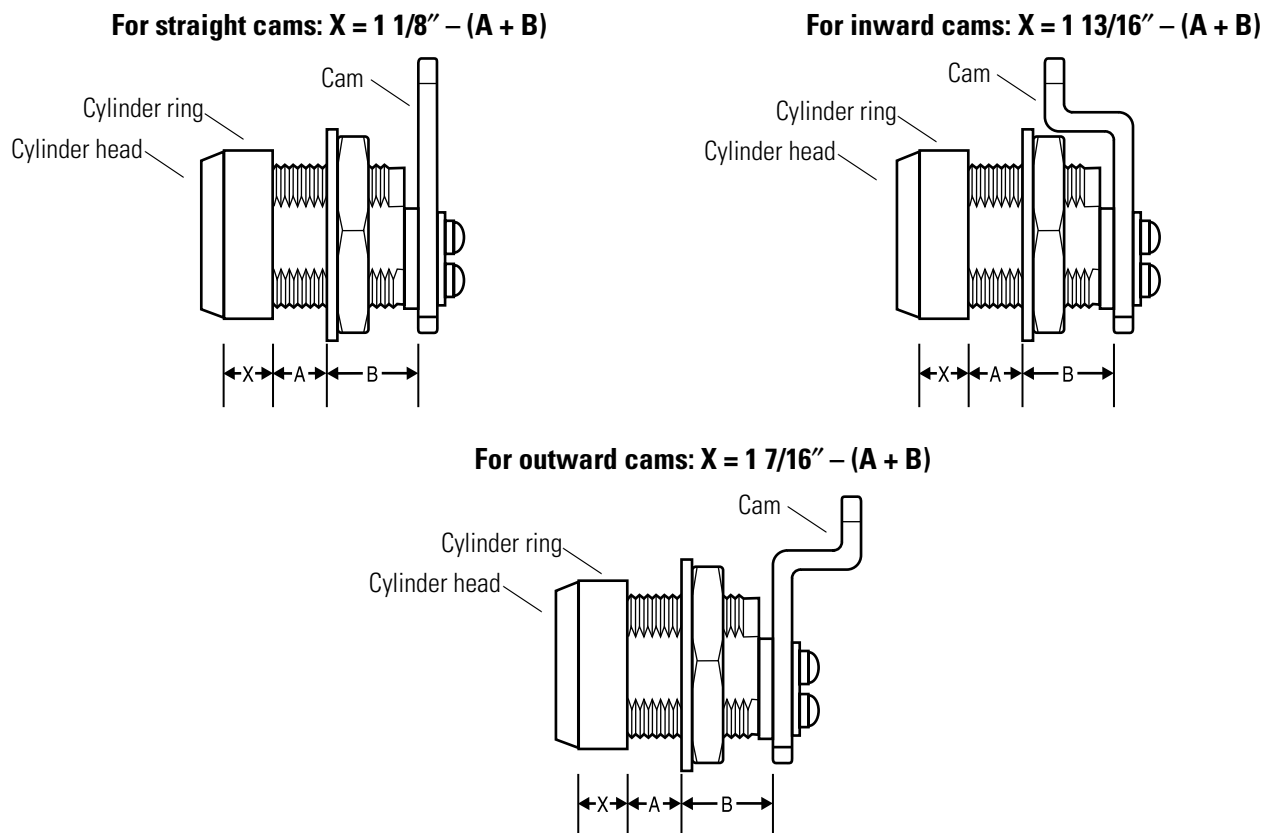
Figure 4.2 5E7 limited motion cabinet cylinder exploded view

## TRIM PARTS

### Cylinder rings **Determining the ring length for 5E7 cylinders**

A cylinder ring is required if there is a gap between the cylinder head and the mounting surface when the cam is positioned for proper lock operation. To determine what length cylinder ring is needed, see [Figure 4.3](#) and perform the following steps:

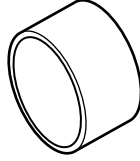
1. Measure in inches the thickness of the mounting surface. See length "A" in [Figure 4.3](#).
2. Measure in inches the desired distance from the cam to the inside of the mounting surface. See length "B" in [Figure 4.3](#).
3. Add together the measurement for "A" from Step 1 and the measurement for "B" from Step 2.



**Figure 4.3** Determining the cylinder ring length

4. *For straight cams*, subtract the total in Step 3 from  $1 \frac{1}{8}"$ . The difference is the length of the cylinder ring needed. See straight cam length "X" in [Figure 4.3](#).  
*For inward mounted cams*, subtract the total in Step 3 from  $1 \frac{13}{16}"$ . The difference is the length of the cylinder ring needed. See inward cam length "X" in [Figure 4.3](#).

For outward mounted cams, subtract the total in Step 3 from  $1 \frac{7}{16}$ ". The difference is the length of the cylinder ring needed. See inward cam length "X" in [Figure 4.3](#). See the parts table below for available cylinder ring lengths.



**Figure 4.4** Cylinder ring (R708 shown)

### Cylinder ring part numbers

| Nomen-<br>clature | Part no. | Length    |
|-------------------|----------|-----------|
| 5E-R701           | A10253   | $1/16$ "  |
| 5E-R702           | A10250   | $1/8$ "   |
| 5E-R703           | A10260   | $3/16$ "  |
| 5E-R704           | A10257   | $1/4$ "   |
| 5E-R705           | A10265   | $5/16$ "  |
| 5E-R706           | A10263   | $3/8$ "   |
| 5E-R707           | A10266   | $7/16$ "  |
| 5E-R708           | A10258   | $1/2$ "   |
| 5E-R709           | A10269   | $9/16$ "  |
| 5E-R710           | A10256   | $5/8$ "   |
| 5E-R711           | A10268   | $11/16$ " |
| 5E-R712           | A10267   | $3/4$ "   |

Mounting  
plates

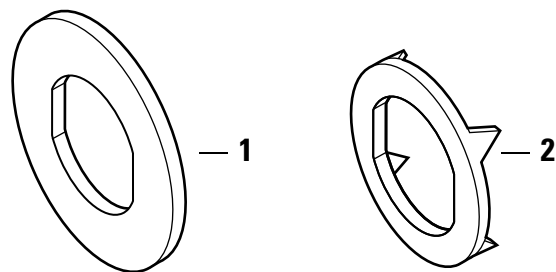


Figure 4.5 Mounting plates

Mounting plates part numbers

| Item | Part no. | Qty. | Description          |
|------|----------|------|----------------------|
| 1    | A14533   | 1    | Round mounting plate |
| 2    | A14534   | 1    | Wood mounting plate  |

Tools

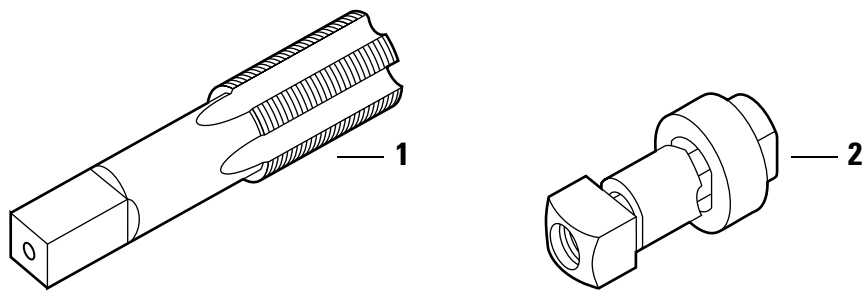


Figure 4.6 Tools

Tools parts list

| Item | Nomen-<br>clature | Part no. | Qty. | Description                | Use   |
|------|-------------------|----------|------|----------------------------|---|
| 1    | 5ED253            | A14053   | 1    | 5E cylinder hole tap       | Tool for rethreading case threads                         |
| 2    | 5ED254            | BT-21071 | 1    | SE-5E 3/4" metal punch die | Tool for punching cabinet holes for cylinder installation |

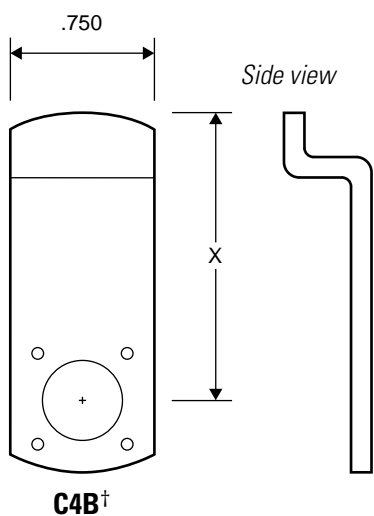
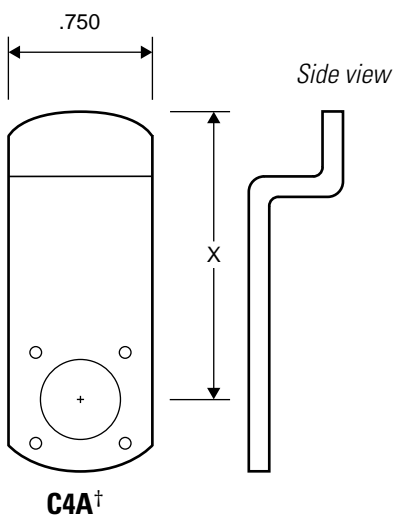
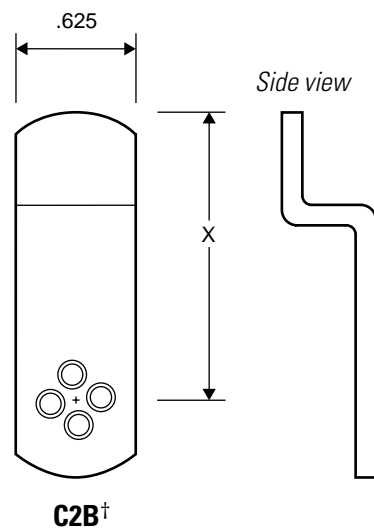
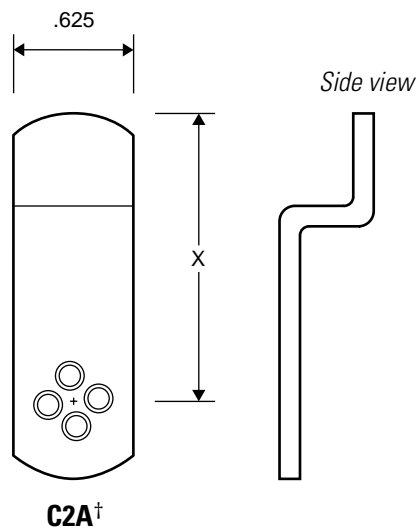


## CAM IDENTIFICATION

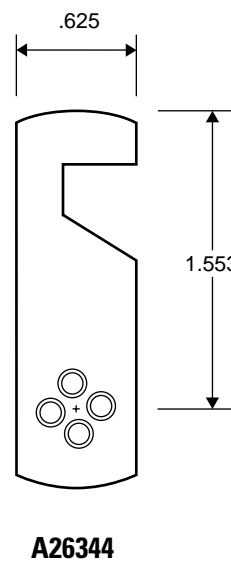
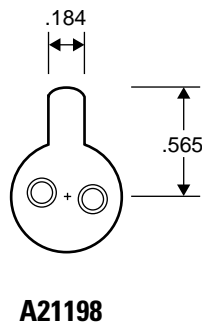
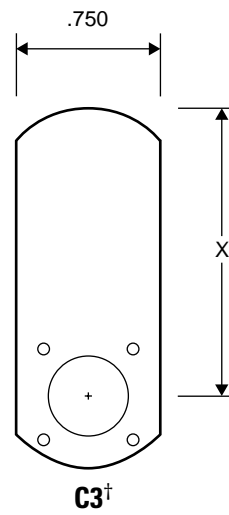
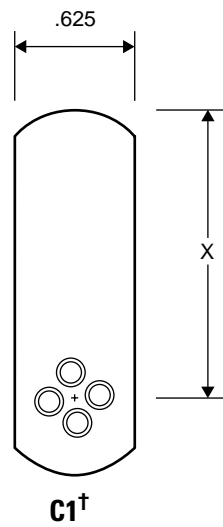
The following section shows common 5E cams and their dimensions in inches. See *Appendix A Cams Table* for a list of E Series cams sorted by part number.

**Note:** Specify “5E” when ordering cams separately (for example, “5E-C2A”).

**Note:** For 5E cam rotations, see [page 5-18](#).



† Specify cam length when ordering. See the BEST Catalog for available cam lengths.



† Specify cam length “X” when ordering. See the BEST Catalog for available cam lengths.

# 5

---

## SERVICE AND MAINTENANCE

---

This chapter contains instructions for replacing components, servicing and maintaining components, and troubleshooting common problems for the 1E Series, 3E Series, and 5E Series cylinders.

| To                           | See page             |
|------------------------------|----------------------|
| Replace mortise cylinders    | <a href="#">5-2</a>  |
| Replace rings                | <a href="#">5-7</a>  |
| Replace riveted cams         | <a href="#">5-8</a>  |
| Replace rim cylinders        | <a href="#">5-10</a> |
| Replace spindles             | <a href="#">5-12</a> |
| Replace cabinet cylinders    | <a href="#">5-13</a> |
| View 1E Series cam rotations | <a href="#">5-16</a> |
| View 5E Series cam rotations | <a href="#">5-18</a> |
| Troubleshoot problems        | <a href="#">5-25</a> |

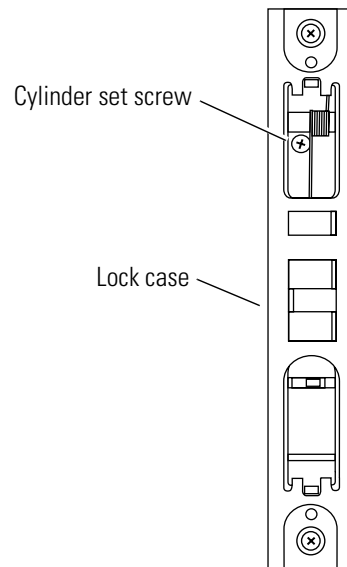
## REPLACING PARTS

### Replacing the standard mortise cylinder

For information about servicing your BEST mortise lock case, see the *H Series Service Manual* [T61964].

#### To remove the mortise cylinder:

1. Unscrew the two faceplate screws and remove the faceplate from the lock case.
2. Insert the control key into the core and rotate the key 15 degrees to the right. Remove the core.
3. Loosen the cylinder set screw, found on the inside of the lock case. See [Figure 5.1](#).

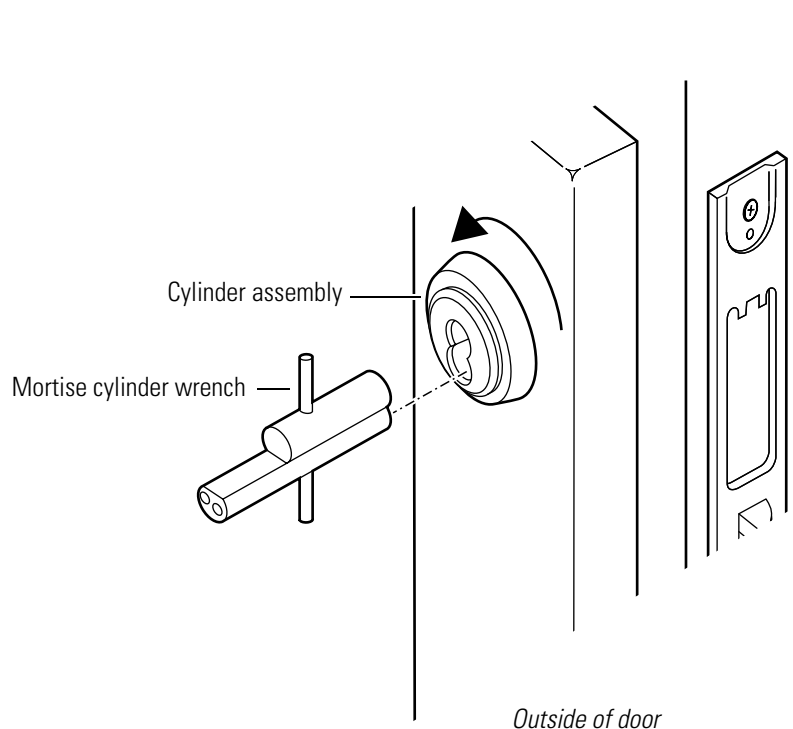


*View from the edge of the door*

**Figure 5.1** Location of the cylinder set screw

4. Using a narrow-bladed screwdriver, insert the blade into the figure-8 opening and back the small set screw into the cylinder until the tip of the screw is below the threads of the cylinder.

5. Insert the mortise cylinder wrench into the cylinder unscrew the cylinder from the lock mortise case.  
See [Figure 5.2](#).

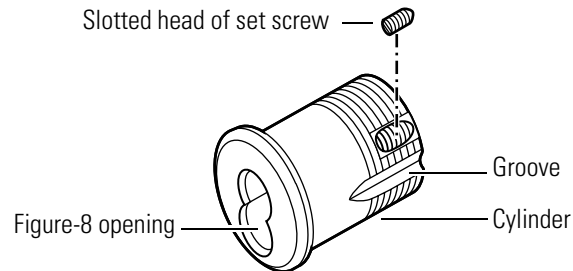


**Figure 5.2** Removing the mortise cylinder

6. Slide the cylinder assembly out of the door.
7. If the lock is double-keyed, repeat steps 2 through 6 for the other cylinder.

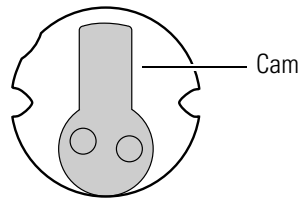
**To reinstall the mortise cylinder:**

1. *If installing a new cylinder:*
  - a. From the outside of the cylinder, thread the slotted head of the set screw into the cylinder. See [Figure 5.3](#).
  - b. Using a narrow-blade screwdriver, insert the blade into the cylinder's figure-8 opening and back the set screw into the cylinder until the tip of the set screw is below the threads of the cylinder.



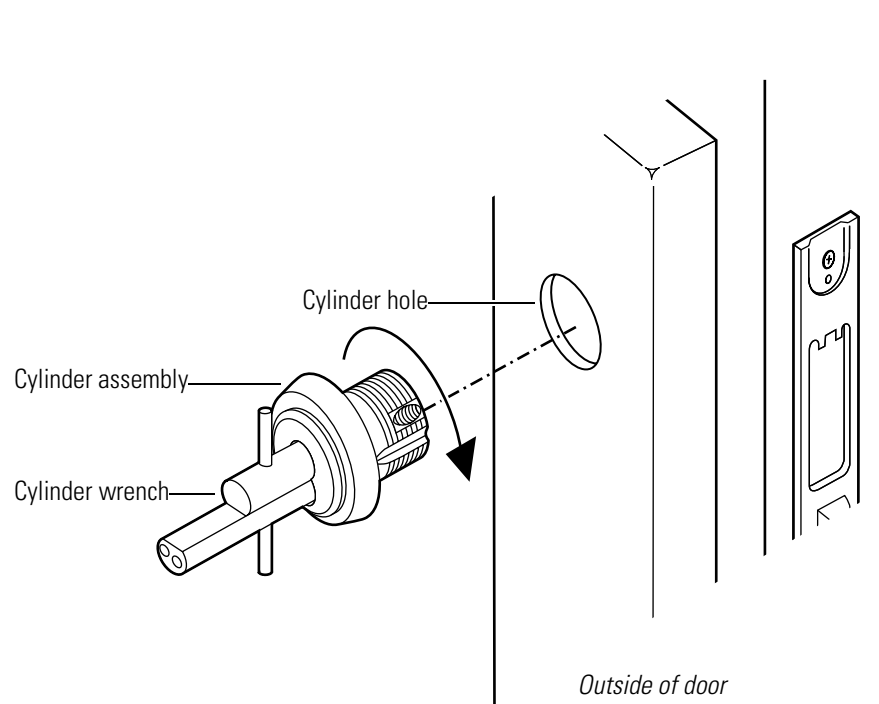
**Figure 5.3** Threading the set screw

2. Place the cylinder ring, if used, on the cylinder.
3. From the back end of the cylinder, rotate the cam to the 12 o'clock position. See [Figure 5.4](#).



**Figure 5.4** Back view of cam in 12 o'clock position

4. With the mortise cylinder wrench inserted into the figure-8 opening, insert the cylinder assembly into the cylinder hole on the outside of the door. See [Figure 5.5](#).



**Figure 5.5** Reinstalling the mortise cylinder

5. *For standard cylinders*, screw the cylinder into the lock case until the cylinder ring is flush against the door.

*For concealed cylinders*, screw the cylinder into the lock case until the groove around the cylinder head is even with the door surface.

*For high security cylinders*, screw the cylinder into the lock case until the cylinder head touches the inside rim of the cylinder ring.



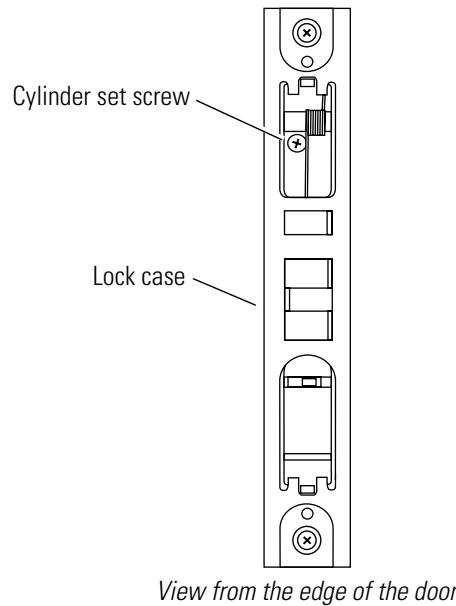
**Caution**

*Be careful not to cross-thread the cylinder during the rotation process to avoid jamming the cylinder in the door.*

*Do not screw the cylinder in too tightly. Doing so may cause you or someone else to be locked out.*

6. Using a narrow-blade screwdriver, insert the blade into the figure-8 opening and tighten the small set screw (installed in the cylinder) into the lock case.

7. Tighten the cylinder set screw, found on the inside of the lock case, into the cylinder groove (see [Figure 5.3](#) for the location of the cylinder groove). See [Figure 5.6](#).



**Figure 5.6** Location of the cylinder set screw (view from the edge of the door)

8. Insert the control key and core into the cylinder. Rotate the control key 15 degrees counterclockwise and then remove the key.
9. If the lock is double-keyed, repeat steps 1 through 8 for the other cylinder.
10. Position the faceplate on the lock case and reinstall the two faceplate screws.
11. Lock and unlock the door to be sure the cylinder is properly installed.



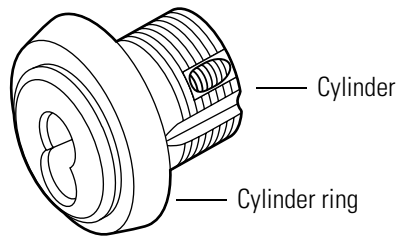
**Replacing the cylinder ring****To remove the cylinder ring:**

1. *For mortise cylinders*, remove the faceplate from the lock case and the cylinder assembly from the door ([page 5-2](#)).

*For rim cylinders*, remove the cylinder assembly from the door ([page 5-10](#)).

*For cabinet cylinders*, remove the cylinder assembly from the cabinet door ([page 5-13](#)).

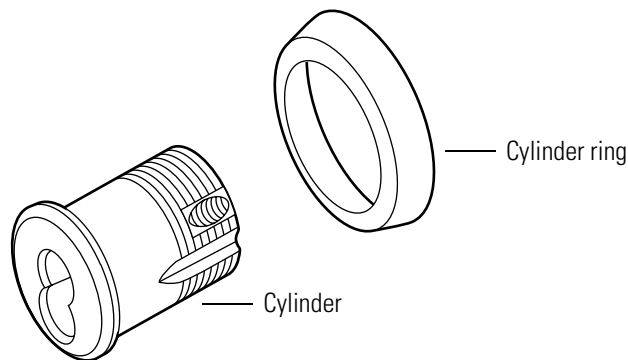
2. Slide the cylinder ring off of the cylinder assembly. See [Figure 5.7](#).



**Figure 5.7** Removing the cylinder ring (mortise cylinder shown)

**To reinstall the cylinder ring:**

1. Select a cylinder ring that will position the cylinder assembly to the correct length in the door.
2. Slide the cylinder ring onto the cylinder assembly. See [Figure 5.8](#).



**Figure 5.8** Reinstalling the cylinder ring (mortise cylinder shown)

3. *For mortise cylinders*, reinstall the cylinder assembly in the door and the faceplate on the lock case ([page 5-4](#)).

*For rim cylinders*, reinstall the cylinder assembly in the door ([page 5-10](#)).

*For cabinet cylinders*, reinstall the cylinder assembly in the cabinet door ([page 5-14](#)).

### Replacing riveted cams

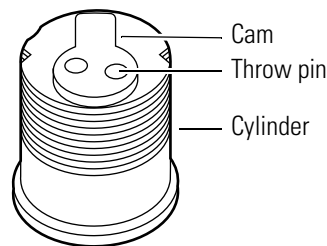
Before beginning this process, get the following parts:

- two new throw pins
- one new throw plug
- one new stamped head.

**Note:** For ordering information, see the parts tables starting on [page 2-2](#) or refer to the BEST Catalog.

#### To the remove the cam:

1. Remove the lock case faceplate, core, and cylinder from the door ([page 5-2](#)).
2. Remove the cylinder ring from the cylinder ([page 5-7](#)).
3. Place the cylinder face down on a flat cloth-covered surface to avoid scratching the front of the cylinder.
4. Position a standard 3/32" punch at the center point of one of the two throw pins. See [Figure 5.9](#).

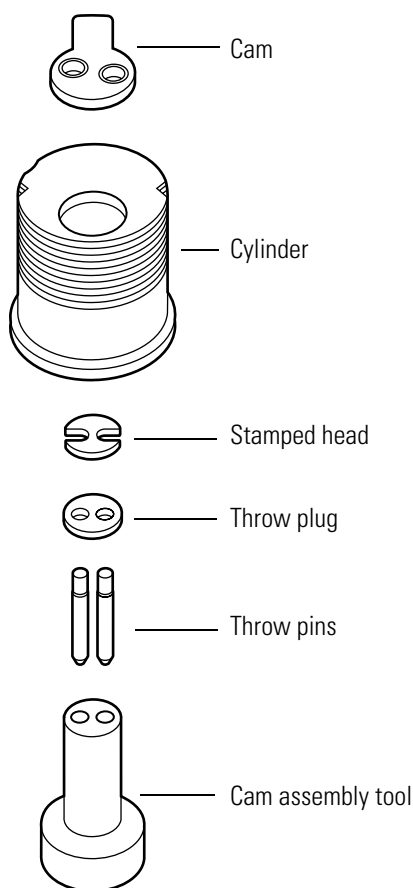


**Figure 5.9** Removing the cam

5. Using a ballpeen hammer, hit the punch two or three times to drive the throw pin out of the cam.
6. Repeat steps 4 and 5 to remove the remaining throw pin. Discard the throw pins.
7. Remove the cam.
8. Discard the stamped head and throw plug.

**To reinstall the cam:**

1. *If installing a new cam*, use the cylinder cam testing tool (page 2-14) to make sure the cam will function properly when installed in the door.
2. Refer to [Figure 5.10](#) and assemble the following parts onto the cam assembly tool:
  - two throw pins
  - throw plug
  - stamped head
  - cylinder.

**Figure 5.10** Reinstalling the cam

3. Position the cam on the back of the cylinder so that the throw pins go through the two cam holes.
4. Using a ballpeen hammer, hit around the edges of the two throw pins until the ends of the throw pins are level with the surface of the cam.

5. Remove the cam assembly tool.

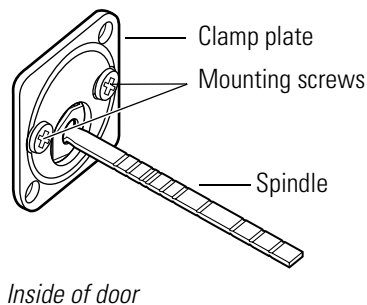
**Note:** If the tool cannot be removed from the cylinder, hold the cylinder in one hand (with the cam in the palm of your hand) and strike the bottom of the cam assembly tool with the ballpeen hammer to loosen the cylinder.

6. Turn the cam clockwise and counterclockwise to make sure it is installed properly.
7. Reinstall the cylinder ring, if present onto the cylinder ([page 5-7](#)).
8. Reinstall the cylinder, the core, and the lock case faceplate on the door ([page 5-4](#)).

### Replacing the rim cylinder

#### To remove the rim cylinder:

1. Remove the necessary trim components to expose the front and back of the rim cylinder. Contact your BEST Representative for more information.
2. On the inside of the door, remove the two mounting screws and the clamp plate. See [Figure 5.11](#).



**Figure 5.11** Removing the rim cylinder

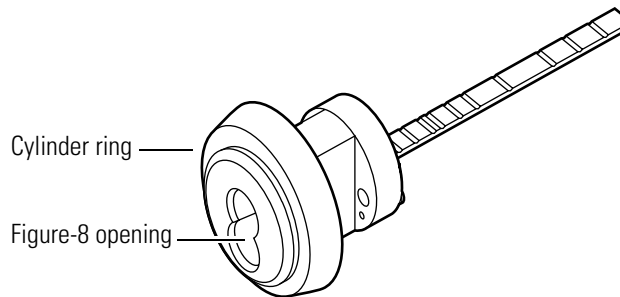
3. Note the orientation of the spindle and slide the cylinder assembly out from the outside of the door.
4. Insert the control key into the core and rotate the key 15 degrees to the right. Remove the core.

#### To reinstall the rim cylinder:

1. Make sure that the cylinder ring, if present, is positioned on the cylinder, as shown in [Figure 5.12](#).
2. Orient the cylinder assembly so that the throw pins are on the bottom of the figure-8 opening.
3. Make sure that the spindle is oriented in the position that you noted above.

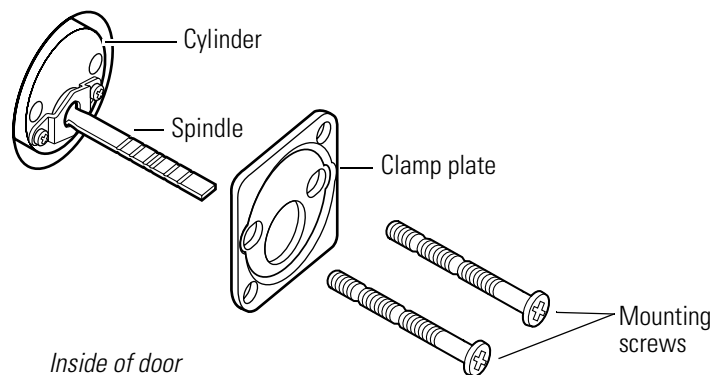
**Note:** Depending on the application, spindles may be installed vertically and horizontally.

4. From the outside of the door, insert the rim cylinder assembly into the cylinder hole.



**Figure 5.12** Figure-8 opening

5. *If installing a new cylinder:*
  - a. Break off the new spindle to match the length of the old spindle.
  - b. Break off the new mounting screws to match the length of the old mounting screws.
6. On the inside of the door, orient the cylinder and clamp plate as shown in [Figure 5.13](#).



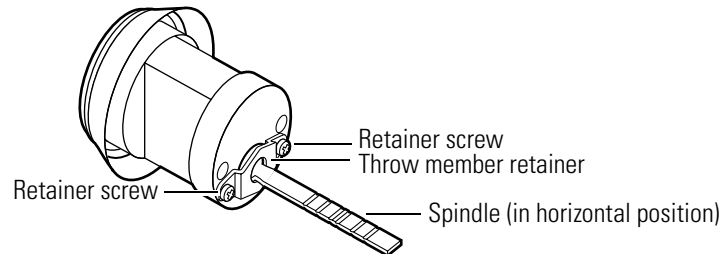
**Figure 5.13** Reinstalling the rim cylinder

7. Secure the clamp plate to the cylinder with the mounting screws.
8. Insert the control key and core into the cylinder. Rotate the control key 15 degrees counterclockwise and then remove the key.
9. Reinstall the necessary trim components. Contact your BEST Representative for more information.
10. Lock and unlock the door to be sure the cylinder is installed properly.

## Replacing the spindle

### To remove the spindle:

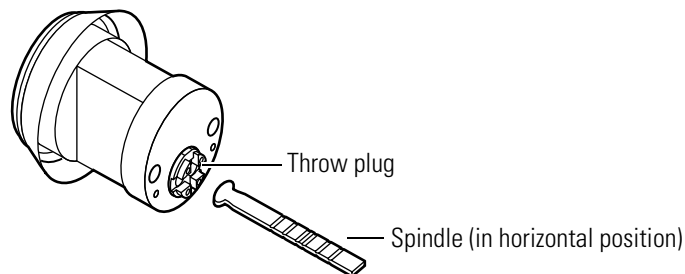
1. Remove the cylinder from the door ([page 5-10](#)).
2. Note the orientation of the spindle (horizontal or vertical).
3. Using a narrow-blade screwdriver, unscrew the two retainer screws and remove the throw member retainer and spindle. See [Figure 5.14](#).



**Figure 5.14** Removing the spindle

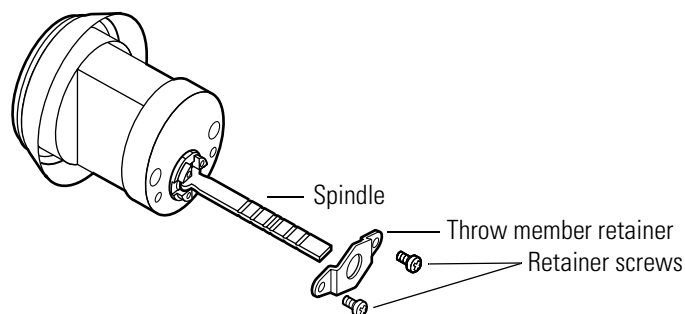
### To reinstall the spindle:

1. Break off the new spindle to match the length of the old spindle.
2. Using the same orientation as the old spindle (horizontal or vertical), align the spindle so that it fits into the throw plug. See [Figure 5.15](#).



**Figure 5.15** Reinstalling the spindle

3. While holding the spindle in place, use a narrow-blade screwdriver to secure the throw member retainer to the back of the cylinder with the two retainer screws. See [Figure 5.16](#).



**Figure 5.16** Securing the spindle

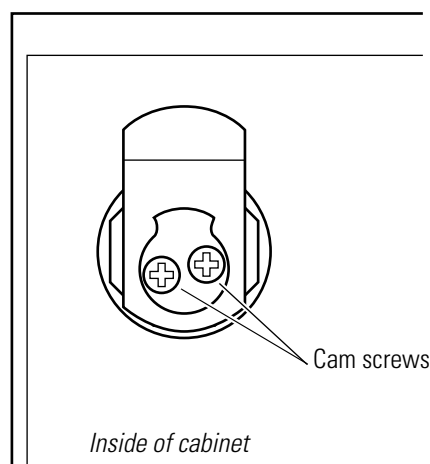
4. Reinstall the cylinder in the door (see [page 5-10](#)).

## Replacing cabinet cylinders

### To remove the cabinet cylinder:

1. Using an operating key, open the cabinet to expose the back of the cylinder assembly.
2. Using a narrow-blade screwdriver, unscrew the two cam screws located on the back of the cylinder assembly. See [Figure 5.17](#).

**Note:** The 1E7E4 cylinder has only one cam screw.



**Figure 5.17** Location of cam screws (5E Series cylinder assembly shown)

3. *For the 1E7D4 cylinder*, remove the following parts (see [page 2-5](#) for part numbers and drawings):

- cam
- throw plug retainer.

*For the 1E7E4 cylinder*, remove the following parts (see [page 2-6](#) for part numbers and drawings):

- washer
- cam driver
- cam with drive pin.

*For 5E Series cylinders*, remove the following parts, if present (see [page 4-2](#) and [page 4-3](#) for part numbers and drawings):

- two washers
- cam driver
- stop plate
- cam
- plug throw.

4. Unscrew the nut and remove it from the cylinder.
5. Remove the lock washer, if present.
6. Slide the cylinder assembly out from the front of the cabinet door.

### To reinstall the cabinet cylinder:

1. Make sure that the cylinder ring is positioned on the cylinder.
2. Insert the cylinder into the front of the cabinet door.
3. While holding the front of the cylinder in place, attach the lock washer, if present, to the back end of the cylinder assembly so that it is flush with the cabinet door.
4. Thread the nut onto the cylinder and tighten it to secure the cylinder in the cabinet door.
5. *For the 1E7D4 cylinder*, reinstall the following parts (see [page 2-5](#) for part numbers and drawings):

- throw plug retainer
- cam in the locked position (see [page 5-16](#) for 1E7D4 cam rotations).

*For the 1E7E4 cylinder*, reinstall the following parts (see [page 2-6](#) for part numbers and drawings):

- cam in the locked position (see [page 5-17](#) for 1E7E4 cam rotations).
- cam driver
- washer.

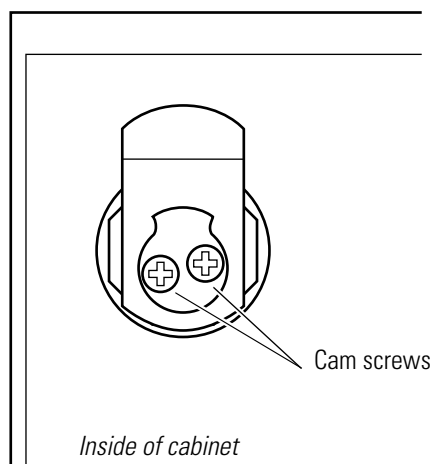
*For 5E cylinders*, reinstall the following parts, if present (see [page 4-2](#) and [page 4-3](#) for part numbers and drawings):

- plug throw
- cam in the locked position (see [page 5-18](#) for 5E cam rotations).
- cam driver
- stop plate
- two washers.



6. Secure the two cam screws to the back of the cylinder assembly. See [Figure 5.18](#).

**Note:** 1E7E4 cylinders have only one cam screw.



**Figure 5.18** Reinstalling the cabinet cylinder (5E Series cylinder assembly shown)

7. Lock and unlock the cabinet to make sure the cylinder is installed properly.

## CAM ROTATIONS FOR 1E SERIES CYLINDERS

### Direct motion cabinet cylinders

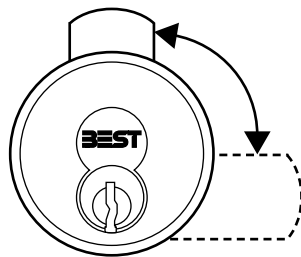
This section shows the cam rotation options for 1E7D4 direct motion cabinet cylinders.

**Note:** The following cam rotations only apply to cylinders with cores installed in the orientation shown.

For direct motion cylinders, the key and cam rotation is direct and both rotate 360°. The key can be removed in the locked position only. The figures below indicate the direction of the cam rotation and the locked position.

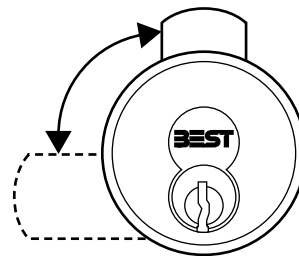
**Note:** See [page 2-20](#) for common cabinet cams.

**1E7D4 LH 12**



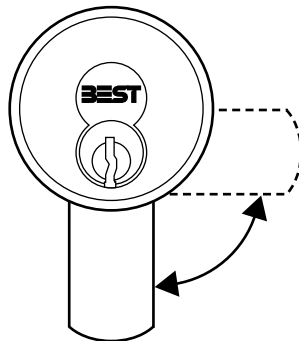
- For upward locking applications
- Cam locks in the 12 o'clock position

**1E7D4 RH 12**



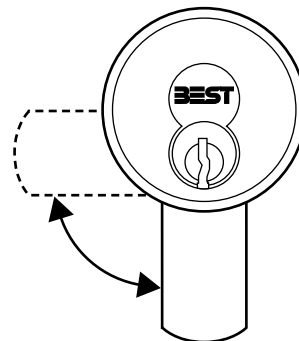
- For upward locking applications
- Cam locks in the 12 o'clock position

**1E7D4 LH 6**



- For downward locking applications
- Cam locks in the 6 o'clock position

**1E7D4 RH 6**



- For downward locking applications
- Cam locks in the 6 o'clock position

## Lost motion cabinet cylinders

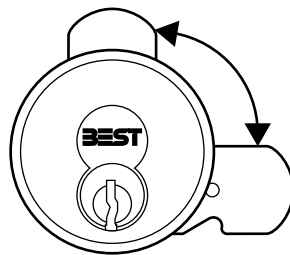
This section shows the cam rotation options for 1E7E4 lost motion cabinet cylinders.

**Note:** The following cam rotations only apply to cylinders with cores installed in the orientation shown.

For lost motion cylinders, the cam rotates 90° and the key rotates 360°. The key can be removed with the cam in the locked or unlocked position. The figures below indicate the direction and range of cam rotation, as well as the locked positions.

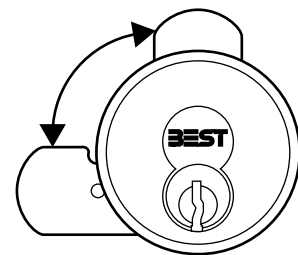
**Note:** See [page 2-20](#) for common cabinet cam options.

**1E7E4 LH 12 or 3**



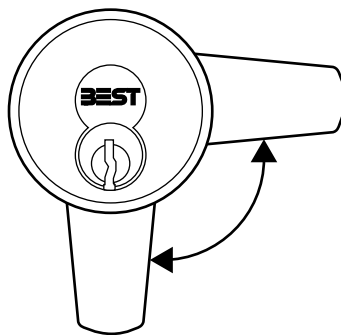
- For upward locking applications
- Cam locks in the 12 o'clock or 3 o'clock position

**1E7E4 RH 12 or 9**



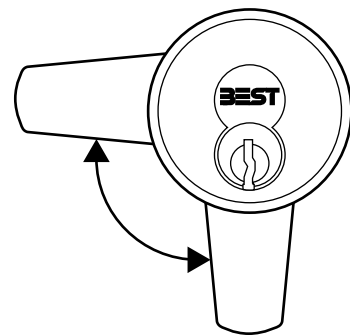
- For upward locking applications
- Cam locks in the 12 o'clock or 9 o'clock position

**1E7E4 LH 3 or 6**



- For downward locking applications
- Cam locks in the 3 o'clock or 6 o'clock position

**1E7E4 RH 6 or 9**

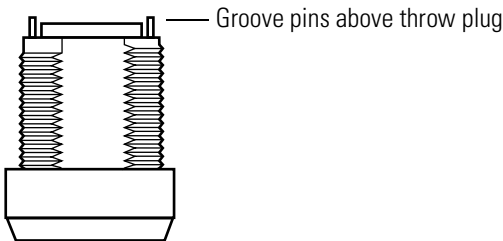


- For downward locking applications
- Cam locks in the 6 o'clock or 9 o'clock position

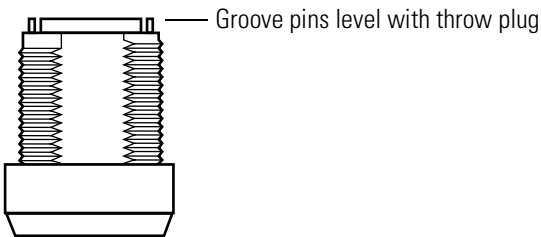
## CAM ROTATIONS FOR 5E SERIES CYLINDERS

The following section contains cam rotation options for 5E Series 7-pin cylinders. 5E Series cylinders are categorized by cam motion type. The table below shows the cam motion types described in this section.

| Type | Motion  | Height of groove pins are:                                      | Cam rotation | Key rotation | Key can be removed when cam is in: |
|------|---------|---|--------------|--------------|------------------------------------|
| B    | Limited | Above the throw plug.<br>See <a href="#">Figure 5.19</a> .      | 90° or 180°  | 90° or 180°  | Locked position                    |
| C    | Lost    | Level with the throw plug.<br>See <a href="#">Figure 5.20</a> . | 90°          | 360°         | Locked or unlocked position        |

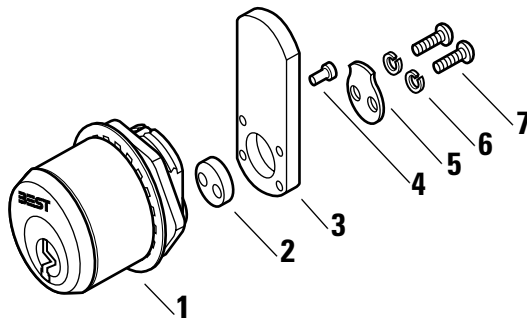


**Figure 5.19** Groove pins installed for limited motion rotations



**Figure 5.20** Groove pins installed for lost motion rotations

# Lost Motion C3 CAM ROTATION



| Item | Part No. | Qty. | Description                             |
|------|----------|------|---|
| 1    | C10861   | 1    | Cylinder and plug assembly <sup>†</sup> |
| 2    | A21150   | 1    | Throw plug                              |
| 3    | A21124   | 1    | Cam                                     |
| 4    | A21099   | 1    | Drive pin                               |
| 5    | A21151   | 1    | Cam driver                              |
| 6    | A14045   | 2    | Washer                                  |
| 7    | A04845   | 2    | Screw                                   |

<sup>†</sup> Shown with cylinder ring, washer, and nut.

**Figure 5.21** 5E Series lost motion C3 cam rotation

The C3 cam is a straight cam mounted for lost motion operation. The diagrams below show rotation assemblies for the C3 cam. The arrow in each diagram indicates where the drive pin should be inserted into the cam. When assembling the cylinder, orient the cam driver and cam in the position shown.

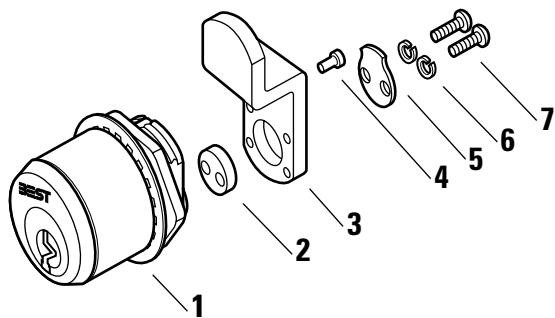
|   |                      |                      |                      |
|---|----------------------|----------------------|----------------------|
| <p><b>12<sup>†</sup> R<sup>‡</sup> 90<sup>††</sup></b></p> <p>Cam driver<br/>Cam<br/>Cylinder and plug assembly<br/>Rear view</p> | <p><b>3 R 90</b></p> | <p><b>6 R 90</b></p> | <p><b>9 R 90</b></p> |
| <p><b>12 L 90</b></p>   | <p><b>3 L 90</b></p> | <p><b>6 L 90</b></p> | <p><b>9 L 90</b></p> |

<sup>†</sup> Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).

<sup>‡</sup> Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).

<sup>††</sup> Indicates the degree of cam rotation (90 = 90°, 180 = 180°).

LOST MOTION C4A CAM ROTATION



| Item | Part No. | Qty. | Description                 |
|------|----------|------|-----------------------------|
| 1    | C10861   | 1    | Cylinder and plug assembly† |
| 2    | A21150   | 1    | Plug throw                  |
| 3    | A13909   | 1    | Cam                         |
| 4    | A21099   | 1    | Drive pin                   |
| 5    | A21151   | 1    | Cam driver                  |
| 6    | A14045   | 2    | Washer                      |
| 7    | A04845   | 2    | Screw                       |

† Shown with cylinder ring, washer, and nut.

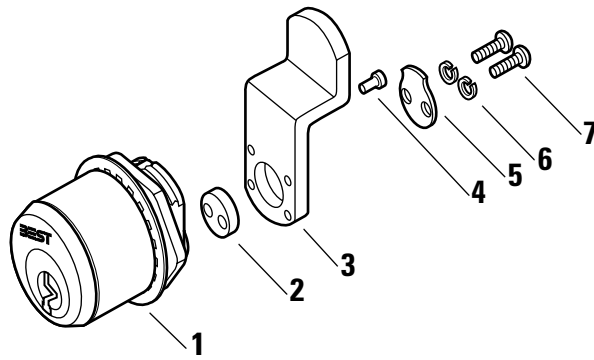
Figure 5.22 5E Series lost motion 4A cam rotation

The 4A cam is an offset cam (inward mount) for lost motion operation. The diagrams below show rotation assemblies for the 4A cam. The arrow in each diagram indicates where the drive pin should be inserted into the cam. When assembling the cylinder, orient the cam driver and cam in the position shown.

|  |                      |                      |                      |
|--|----------------------|----------------------|----------------------|
| <p><b>12† R‡ 90††</b></p> <p>Cam driver<br/>Cam<br/>Cylinder and plug assembly<br/>Rear view</p> | <p><b>3 R 90</b></p> | <p><b>6 R 90</b></p> | <p><b>9 R 90</b></p> |
| <p><b>12 L 90</b></p>  | <p><b>3 L 90</b></p> | <p><b>6 L 90</b></p> | <p><b>9 L 90</b></p> |

- † Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).
- ‡ Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).
- †† Indicates the degree of cam rotation (90 = 90°, 180 = 180°).

## LOST MOTION C4B CAM ROTATION



| Item | Part No. | Qty. | Description                             |
|------|----------|------|---|
| 1    | C10861   | 1    | Cylinder and plug assembly <sup>†</sup> |
| 2    | A21150   | 1    | Plug throw                              |
| 3    | A21125   | 1    | Cam                                     |
| 4    | A21099   | 1    | Drive pin                               |
| 5    | A21151   | 1    | Cam driver                              |
| 6    | A14045   | 2    | #4 lock washer                          |
| 7    | A04845   | 2    | Screw                                   |

<sup>†</sup> Shown with cylinder ring, washer, and nut.

**Figure 5.23** 5E Series lost motion 4B cam rotation

The 4B cam is an offset cam (outward mount) for lost motion operation. The diagrams below show rotation assemblies for the 4B cam. The arrow in each diagram indicates where the drive pin should be inserted into the cam. When assembling the cylinder, orient the cam driver and cam in the position shown.

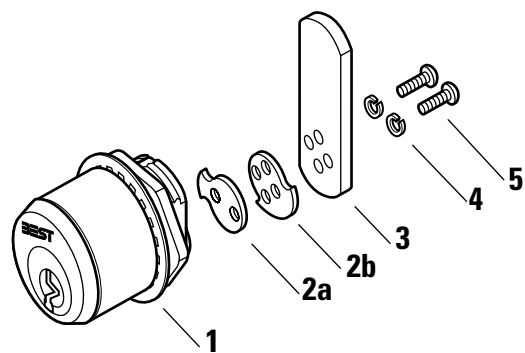
|   |                      |                      |                      |
|---|----------------------|----------------------|----------------------|
| <p><b>12<sup>†</sup> R<sup>‡</sup> 90<sup>††</sup></b></p> <p>Cam driver<br/>Cam<br/>Cylinder and plug assembly<br/>Rear view</p> | <p><b>3 R 90</b></p> | <p><b>6 R 90</b></p> | <p><b>9 R 90</b></p> |
| <p><b>12 L 90</b></p>   | <p><b>3 L 90</b></p> | <p><b>6 L 90</b></p> | <p><b>9 L 90</b></p> |

<sup>†</sup> Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).

<sup>‡</sup> Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).

<sup>††</sup> Indicates the degree of cam rotation (90 = 90°, 180 = 180°).

LIMITED MOTION C1 CAM ROTATION



| Item | Part No. | Qty. | Description                             |
|------|----------|------|---|
| 1    | C10861   | 1    | Cylinder and plug assembly <sup>†</sup> |
| 2a   | A21302   | 1    | 180° rotation stop plate                |
| 2b   | A14065   | 1    | 90° rotation stop plate                 |
| 3    | A10281   | 1    | Cam                                     |
| 4    | A09930   | 2    | Washer                                  |
| 5    | A09929   | 2    | Screw                                   |

<sup>†</sup> Shown with cylinder ring, washer, and nut.

Figure 5.24 5E Series limited motion C1 cam rotation

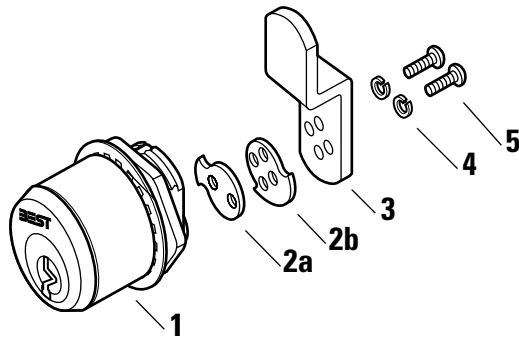
The C1 cam is a straight cam mounted for fixed motion operation. The diagrams below show rotation assemblies for the C1 cam. Use the diagrams below to determine the orientation of the stop plate and cam.

|   |                    |                    |                    |
|---|--------------------|--------------------|--------------------|
| <b>12<sup>†</sup> R<sup>‡</sup> 90<sup>††</sup></b><br><br>Stop plate<br>Cam<br>Rear view<br>Cylinder and plug assembly | <b>3 R 90</b><br>  | <b>6 R 90</b><br>  | <b>9 R 90</b><br>  |
| <b>12 R 180</b><br>   | <b>3 R 180</b><br> | <b>6 R 180</b><br> | <b>9 R 180</b><br> |
| <b>12 L 90</b><br>  | <b>3 L 90</b><br>  | <b>6 L 90</b><br>  | <b>9 L 90</b><br>  |
| <b>12 L 180</b><br>   | <b>3 L 180</b><br> | <b>6 L 180</b><br> | <b>9 L 180</b><br> |

<sup>†</sup> Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).  
<sup>‡</sup> Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).  
<sup>††</sup> Indicates the degree of cam rotation (90 = 90°, 180 = 180°).



## LIMITED MOTION C2A CAM ROTATION



| Item | Part No. | Qty. | Description                             |
|------|----------|------|---|
| 1    | C10861   | 1    | Cylinder and plug assembly <sup>†</sup> |
| 2a   | A21302   | 1    | 180° rotation stop plate                |
| 2b   | A14065   | 1    | 90° rotation stop plate                 |
| 3    | A14050   | 1    | Cam                                     |
| 4    | A09930   | 2    | Washer                                  |
| 5    | A09929   | 2    | Screw                                   |

<sup>†</sup> Shown with cylinder ring, washer, and nut.

**Figure 5.25** 5E Series limited motion C2A cam rotation

The C2A cam is an offset cam (inward mount) for fixed motion operation. The diagrams below show rotation assemblies for the 2A cam. Use the diagrams below to determine the orientation of the stop plate and cam.

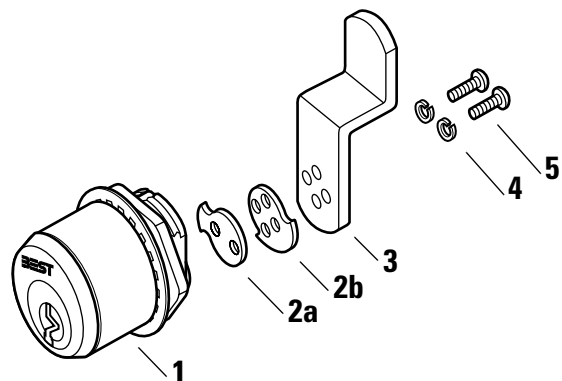
|   |                    |                    |                    |
|---|--------------------|--------------------|--------------------|
| <b>12<sup>†</sup> R<sup>‡</sup> 90<sup>††</sup></b><br><br>Stop plate    Cam    Cylinder and plug assembly<br>Rear view | <b>3 R 90</b><br>  | <b>6 R 90</b><br>  | <b>9 R 90</b><br>  |
| <b>12 R 180</b><br>   | <b>3 R 180</b><br> | <b>6 R 180</b><br> | <b>9 R 180</b><br> |
| <b>12 L 90</b><br>  | <b>3 L 90</b><br>  | <b>6 L 90</b><br>  | <b>9 L 90</b><br>  |
| <b>12 L 180</b><br>   | <b>3 L 180</b><br> | <b>6 L 180</b><br> | <b>9 L 180</b><br> |

<sup>†</sup> Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).

<sup>‡</sup> Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).

<sup>††</sup> Indicates the degree of cam rotation (90 = 90°, 180 = 180°).

LIMITED MOTION C2B CAM ROTATION



| Item | Part No. | Qty. | Description                 |
|------|----------|------|-----------------------------|
| 1    | C10861   | 1    | Cylinder and plug assembly† |
| 2a   | A21302   | 1    | 180° rotation stop plate    |
| 2b   | A14065   | 1    | 90° rotation stop plate     |
| 3    | A14051   | 1    | Cam                         |
| 4    | A09930   | 2    | Washer                      |
| 5    | A09929   | 2    | Screw                       |

† Shown with cylinder ring, washer, and nut.

Figure 5.26 5E Series limited motion C2B cam rotation

The C2B cam is an offset cam (outward mount) for fixed motion operation. The diagrams below show rotation assemblies for the 2B cam. Use the diagrams below to determine the orientation of the stop plate and cam.

|   |                    |                    |                    |
|---|--------------------|--------------------|--------------------|
| <b>12† R‡ 90††</b><br><br>Stop plate    Cam Rear view    Cylinder and plug assembly | <b>3 R 90</b><br>  | <b>6 R 90</b><br>  | <b>9 R 90</b><br>  |
| <b>12 R 180</b><br>   | <b>3 R 180</b><br> | <b>6 R 180</b><br> | <b>9 R 180</b><br> |
| <b>12 L 90</b><br>  | <b>3 L 90</b><br>  | <b>6 L 90</b><br>  | <b>9 L 90</b><br>  |
| <b>12 L 180</b><br>   | <b>3 L 180</b><br> | <b>6 L 180</b><br> | <b>9 L 180</b><br> |

† Indicates the locked cam mounting position as seen from the front of the cylinder (for example, 12 = 12 o'clock position).

‡ Indicates the direction of cam rotation as seen from the front of the cylinder (L = left, R = right).

†† Indicates the degree of cam rotation (90 = 90°, 180 = 180°).

## TROUBLESHOOTING

The table summarizes the possible causes for certain cylinder problems. The causes of failure are listed in the order of likelihood. (The most like cause is first, and so forth.)

For problems with the core and key, such as difficulty removing or inserting the key or difficulty turning the key, see the *Core and Key Service Manual* [T35527].

For problems with the BEST mortise lock case, see the *H Series Service Manual* [T61964].

| You notice...                             | Possible causes include...   | You should...  |
|---|--|--|
| Cannot remove the core from the cylinder. | Set screw is installed with the slotted head toward the outside of the cylinder, securing the core in the cylinder.  | Remove the mortise case faceplate (pg. 5-2). Using a narrow-bladed screwdriver, loosen the set screw so that the core can be removed from the cylinder.<br><br><b>Note:</b> To use the set screw to secure the cylinder to the mortise case, reverse the position of the set screw in the cylinder (pg. 5-4).                                    |
| Cannot insert the core into the cylinder. | <ul style="list-style-type: none"> <li>a. Set screw is installed too far down in the cylinder.</li> <li>b. Throw pins are not horizontally aligned.</li> <li>c. A 7-pin core is being inserted into a 7-pin cylinder that has a 6-pin spacer installed.</li> </ul> | <ul style="list-style-type: none"> <li>a. Remove the mortise case faceplate (pg. 5-2) and use a screwdriver to adjust the position of the set screw (pg. 5-4).</li> <li>b. Adjust the two throw pins so they are aligned with the two core holes.</li> <li>c. Remove the spacer from the cylinder.</li> </ul>                                    |
| Cannot turn key easily in the core.       | <ul style="list-style-type: none"> <li>a. Cam is riveted too tightly onto the cylinder.</li> <li>b. Cylinder ring is too deep or too shallow for the cylinder being used.</li> <li>c. Wrong cam is being used for the lock application.</li> </ul>                 | <ul style="list-style-type: none"> <li>a. Place the cylinder on the cam assembly tool and strike the cam once or twice with a ballpeen hammer to loosen it. Repeat if necessary.</li> <li>b. Replace the old ring with a ring of appropriate size.</li> <li>c. Replace the old cam with the cam appropriate for the lock application.</li> </ul> |



# A

---

## E SERIES CAMS TABLE

The following table lists E Series cams according to their part numbers.

**Note:** Cylinders 2 inches or longer require a thumbturn cam.

**E SERIES CAMS**

| <b>Part no.</b> | <b>Cam</b> | <b>Series</b> | <b>Description</b> |
|-----------------|------------|---------------|--------------------|
| A00117          | C101       | 1E            | Straight           |
| A00490          | C102       | 1E            | Two-point          |
| A00533          | C103       | 1E            | Straight           |
| A00683          | C110       | 1E            | Straight           |
| A00921          | C114       | 1E            | Two-point          |
| A00967          | C115       | 1E            | Straight           |
| A00995          | C118       | 1E, 3E        | Cloverleaf         |
| A01172          | C121       | 1E            | Straight           |
| A01225          | C123       | 1E            | Straight           |
| A01231          | C124       | 1E            | Straight           |
| A01247          | C127       | 1E, 3E        | Straight           |
| A01248          | C128       | 1E            | Straight           |
| A01249          | C129       | 1E            | Straight           |
| A01400          | C130       | 1E            | Straight           |
| A01401          | C131       | 1E            | Straight           |
| A01414          | C134       | 1E            | Straight           |
| A01416          | C136       | 1E, 3E        | Straight           |
| A01417          | C137       | 1E            | Straight           |
| A01449          | C140       | 1E            | Thumbturn          |
| A01475          | C142       | 1E            | Roller             |
| A01487          | C143       | 1E            | Straight           |
| A01707          | C148       | 1E            | Straight           |
| A01799          | C152       | 1E            | Straight           |
| A02532          | C253       | 1E            | Cabinet            |
| A02534          | C235       | 1E            | Cabinet            |
| A02770          | C161       | 1E, 3E        | Cloverleaf         |
| A04284          | C221       | 1E            | Roller             |
| A04387          | C162       | 1E            | Straight           |
| A04399          | C165       | 1E            | Straight           |
| A04445          | C169       | 1E            | Straight           |

| Part no. | Cam  | Series | Description |
|----------|------|--------|-------------|
| A04492   | C171 | 1E     | Straight    |
| A04533   | NA   | 1E, 3E | Roller      |
| A04607   | NA   | 1E     | Cabinet     |
| A04737   | C254 | 1E     | Cloverleaf  |
| A05397   | C177 | 1E     | Straight    |
| A05466   | C178 | 1E     | Straight    |
| A05979   | C181 | 1E     | Straight    |
| A05989   | C182 | 1E     | Straight    |
| A06060   | C185 | 1E     | Straight    |
| A06190   | C186 | 1E     | Straight    |
| A06246   | C187 | 1E     | Straight    |
| A06419   | C191 | 1E     | Straight    |
| A06421   | C238 | 1E     | Cabinet     |
| A07190   | C193 | 1E     | Straight    |
| A07212   | C239 | 1E     | Straight    |
| A07221   | C240 | 1E     | Roller      |
| A07543   | C199 | 1E     | Cabinet     |
| A07605   | C200 | 1E     | Straight    |
| A07747   | C203 | 1E     | Straight    |
| A07880   | C204 | 1E     | Cloverleaf  |
| A07990   | C229 | 1E     | Cabinet     |
| A08095   | C224 | 1E     | Cabinet     |
| A08778   | C228 | 1E     | Cabinet     |
| A08854   | NA   | 1E     | Cabinet     |
| A09225   | C241 | 1E     | Cabinet     |
| A09229   | C223 | 1E     | Straight    |
| A09230   | C243 | 1E     | Cloverleaf  |
| A09359   | C233 | 1E     | Straight    |
| A09419   | C245 | 5E     | Cabinet     |
| A09881   | C246 | 1E     | Cabinet     |
| A10281   | NA   | 5E     | Cabinet     |
| A10500   | C401 | 1E     | Thumbturn   |

## E Series Cams Table

| Part no. | Cam  | Series | Description |
|----------|------|--------|-------------|
| A10501   | C402 | 1E     | Thumbturn   |
| A10502   | C403 | 1E     | Thumbturn   |
| A10503   | C404 | 1E     | Thumbturn   |
| A10504   | C405 | 1E     | Thumbturn   |
| A10505   | C406 | 1E     | Thumbturn   |
| A10506   | C407 | 1E     | Thumbturn   |
| A10507   | C408 | 1E     | Thumbturn   |
| A10508   | C409 | 1E     | Thumbturn   |
| A10509   | C410 | 1E     | Thumbturn   |
| A10510   | C411 | 1E     | Thumbturn   |
| A10511   | C412 | 1E     | Thumbturn   |
| A10512   | C413 | 1E     | Thumbturn   |
| A10513   | C414 | 1E     | Thumbturn   |
| A10514   | C415 | 1E     | Thumbturn   |
| A10515   | C416 | 1E     | Thumbturn   |
| A10516   | C417 | 1E     | Thumbturn   |
| A10517   | C418 | 1E     | Thumbturn   |
| A10518   | C419 | 1E     | Thumbturn   |
| A10519   | C420 | 1E     | Thumbturn   |
| A10520   | C421 | 1E     | Thumbturn   |
| A10521   | C422 | 1E     | Thumbturn   |
| A10522   | C423 | 1E     | Thumbturn   |
| A10523   | C424 | 1E     | Thumbturn   |
| A10524   | C425 | 1E     | Thumbturn   |
| A10525   | C426 | 1E     | Thumbturn   |
| A10526   | C427 | 1E     | Thumbturn   |
| A10527   | C428 | 1E     | Thumbturn   |
| A10528   | C429 | 1E     | Thumbturn   |
| A10529   | C430 | 1E     | Thumbturn   |
| A10530   | C431 | 1E     | Thumbturn   |
| A10531   | C432 | 1E     | Thumbturn   |
| A10532   | C433 | 1E     | Thumbturn   |



| Part no. | Cam  | Series | Description |
|----------|------|--------|-------------|
| A10533   | C434 | 1E     | Thumbturn   |
| A10534   | C435 | 1E     | Thumbturn   |
| A10535   | C436 | 1E     | Thumbturn   |
| A10536   | C437 | 1E     | Thumbturn   |
| A10537   | C438 | 1E     | Thumbturn   |
| A10538   | C439 | 1E     | Thumbturn   |
| A10539   | C440 | 1E     | Thumbturn   |
| A10540   | C441 | 1E     | Thumbturn   |
| A10541   | C442 | 1E     | Thumbturn   |
| A10542   | C443 | 1E     | Thumbturn   |
| A10543   | C444 | 1E     | Thumbturn   |
| A10544   | C445 | 1E     | Thumbturn   |
| A10545   | C446 | 1E     | Thumbturn   |
| A10546   | C447 | 1E     | Thumbturn   |
| A10547   | C448 | 1E     | Thumbturn   |
| A10548   | C449 | 1E     | Thumbturn   |
| A10549   | C450 | 1E     | Thumbturn   |
| A13909   | C4A  | 5E     | Cabinet     |
| A14050   | C2A  | 5E     | Cabinet     |
| A14051   | C2B  | 5E     | Cabinet     |
| A14154   | NA   | 1E     | Cabinet     |
| A14333   | C220 | 1E     | Straight    |
| A14472   | C210 | 1E, 3E | Straight    |
| A14520   | C208 | 1E, 3E | Straight    |
| A14521   | C209 | 1E     | Straight    |
| A15981   | C211 | 1E     | Straight    |
| A17744   | C226 | 1E     | Straight    |
| A19851   | C247 | 1E     | Straight    |
| A20010   | C248 | 1E     | Cabinet     |
| A20023   | C249 | 1E     | Cabinet     |
| A20069   | C250 | 1E     | Cabinet     |
| A20128   | C227 | 1E     | Roller      |

## E Series Cams Table

---

| Part no. | Cam  | Series | Description |
|----------|------|--------|-------------|
| A20332   | C251 | 1E     | Roller      |
| A20421   | C225 | 1E     | Cabinet     |
| A20474   | C252 | 1E     | Straight    |
| A20877   | C222 | 1E     | Cloverleaf  |
| A20931   | C231 | 1E     | Straight    |
| A20942   | C242 | 1E     | Straight    |
| A21124   | C3   | 5E     | Cabinet     |
| A21125   | 4B   | 5E     | Cabinet     |
| A21198   | NA   | 5E     | Cabinet     |
| A23770   | C256 | 1E     | Cloverleaf  |
| A26344   | NA   | 5E     | Cabinet     |
| A40088   | C234 | 1E     | Straight    |
| A40091   | C4   | 1E, 3E | Straight    |
| A40092   | C3   | 3E     | Straight    |
| A63060   | C500 | 1E     | Cabinet     |
| A63061   | C501 | 1E     | Cabinet     |
| A63062   | C502 | 1E     | Cabinet     |
| A63063   | C503 | 1E     | Cabinet     |
| A63064   | C504 | 1E     | Cabinet     |
| A63065   | C505 | 1E     | Cabinet     |
| A63066   | C506 | 1E     | Cabinet     |
| A63067   | C507 | 1E     | Cabinet     |
| A63068   | C508 | 1E     | Cabinet     |
| A63069   | C509 | 1E     | Cabinet     |
| B04796   | C173 | 1E     | Straight    |
| B05467   | C179 | 1E     | Straight    |
| B34077   | C258 | 1E     | Cloverleaf  |
| B34562   | C281 | 1E     | Cloverleaf  |
| B39256   | C265 | 1E     | Cloverleaf  |

# B

---

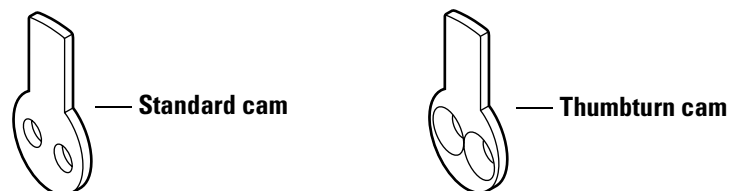
## THUMBTURN CAM CONVERSION TABLE

The following pages list standard cams with part numbers and their equivalent counter-sunk thumbturn cams with part numbers.

**Note:** Cylinders 2 inches or longer require a thumbturn cam.

## THUMBTURN CAM CONVERSION TABLE

The following table lists standard cams with part numbers and their equivalent counter-sunk thumbturn cams with part numbers. [Figure 2.1](#) shows a standard cam and its equivalent thumbturn cam.



**Figure 2.1** C4 standard cam and equivalent C140 thumbturn cam

| Standard |          | Thumbturn |          |
|----------|----------|-----------|----------|
| Cam      | Part no. | Cam       | Part no. |
| C4       | A40091   | C140      | A01449   |
| C101     | A00117   | C425      | A10524   |
| C103     | A00533   | C447      | A10546   |
| C115     | A00967   | C444      | A10543   |
| C118     | A00995   | C401      | A10500   |
| C121     | A01172   | C402      | A10501   |
| C123     | A01225   | C443      | A10542   |
| C127     | A01247   | C403      | A10502   |
| C128     | A01248   | C404      | A10503   |
| C129     | A01249   | C405      | A10504   |
| C134     | A01414   | C406      | A10505   |
| C136     | A01416   | C432      | A10531   |
| C137     | A01417   | C442      | A10541   |
| C142     | A01513   | C426      | A10525   |
| C143     | A01487   | C407      | A10506   |
| C151     | A01798   | C434      | A10533   |
| C161     | A02770   | C408      | A10507   |
| C162     | A04387   | C409      | A10508   |
| C164     | A04398   | C430      | A10529   |
| C165     | A04399   | C424      | A10523   |
| C169     | A04445   | C410      | A10509   |

| <b>Standard</b> |                 | <b>Thumbturn</b> |                 |
|-----------------|-----------------|------------------|-----------------|
| <b>Cam</b>      | <b>Part no.</b> | <b>Cam</b>       | <b>Part no.</b> |
| C171            | A04492          | C423             | A10522          |
| C173            | B04796          | C411             | A10510          |
| C178            | A05466          | C433             | A10532          |
| C179            | B05467          | C412             | A10511          |
| C181            | A05979          | C413             | A10512          |
| C186            | A06190          | C414             | A10513          |
| C191            | A06419          | C428             | A10527          |
| C193            | A07190          | C429             | A10528          |
| C200            | A07605          | C436             | A10535          |
| C201            | A07698          | C445             | A10544          |
| C203            | A07747          | C441             | A10540          |
| C208            | A14520          | C417             | A10516          |
| C209            | A14521          | C418             | A10517          |
| C210            | A14472          | C416             | A10515          |
| C211            | A15981          | C419             | A10518          |
| C222            | A17744          | C420             | A10519          |
| C226            | A17744          | C422             | A10521          |
| C231            | A20931          | C421             | A10520          |
| C241            | A09229          | C415             | A10514          |
| C244            | A20511          | C446             | A10545          |
| C258            | B34077          | C427             | A10526          |
| C265            | B39256          | C431             | A10530          |
| C273            | A24039          | C437             | A10536          |
| C277            | A34312          | C439             | A10538          |
| C278            | A34313          | C438             | A10537          |
| C279            | A20701          | C440             | A10539          |
| C281            | B34562          | C448             | A10547          |
| NA              | A09404          | C435             | A10534          |
| NA              | A20010          | C449             | A10548          |
| NA              | A23770          | C450             | A10549          |



# C

---

## GLOSSARY

|                          |   |
|--------------------------|---|
| <b>Cam</b>               | Part of the cylinder that rotates to actuate the deadbolt or latchbolt as the key is turned. The cam may also act as the bolt in a utility cam lock.  |
| <b>Cam assembly tool</b> | Tool used for assembling the cam to the mortise cylinder.   |
| <b>Clamp plate</b>       | Metal plate on the inside of a door used to secure a rim lock cylinder to the door by means of clamp screws. The spindle of the cylinder extends through a hole in the clamp plate.   |
| <b>Core</b>              | Interchangeable figure-8 device that can be installed in a lock or door and operated by a key.  |
| <b>Cylinder</b>          | Subassembly of a lock containing a plug with keyway and a body with tumbled mechanism. Cylinders may have either a cam (See <i>Mortise cylinder</i> ) or a spindle (see <i>Rim cylinder</i> ) as the actuator.                      |
| <b>Cylinder die</b>      | Tool for rethreading a 1 5/32" diameter cylinder.   |
| <b>Cylinder lock</b>     | Lock in which the locking mechanism is controlled by a cylinder. A double-cylinder lock has a cylinder on both the inside and outside of the door.  |
| <b>Cylinder ring</b>     | Metal ring, surrounding the exposed portion of a lock cylinder, which protects the cylinder from being wrenched, turned, pried, cut, or pulled with attack tools. The cylinder ring also adapts the cylinder to the door thickness. |
| <b>Cylinder tap</b>      | Tool for rethreading lock case threads.   |
| <b>Cylinder wrench</b>   | Tool for installing, removing, and testing cylinders.   |

|                         |   |
|-------------------------|---|
| <b>Dummy cylinder</b>   | Nonfunctional cylinder without an operating mechanism used for appearance only. Dummy cylinders are available for mortise and rim locks.  |
| <b>Faceplate</b>        | Part of the mortise lock that serves as a facing or covering over the front of the lock.  |
| <b>Hand-of-door</b>     | Opening direction of the door. A right-hand door (RH) is called “right-hand” because it is opened with the right hand. A right-hand door is hinged on the right and swings inward when viewed from the outside. A left-handed door (LH) is hinged on the left and swings inward when viewed from the outside. If a door swings outward, it is referred to as a right hand reverse bevel door (RHRB) or a left-hand reverse bevel door (LHRB). |
| <b>Latchbolt</b>        | Beveled, spring-actuated, bolt which may or may not include a deadlocking feature. The latchbolt must be actuated by a key, knob, or turn knob.   |
| <b>Lock</b>             | Device that secures openings and entrances such as doors, gates, cabinets, and so forth. Locks include mechanical, electromechanical, and electronic security devices.  |
| <b>Mortise</b>          | Rectangular cavity cut into the edge of a door. Mortise also can mean the act of making such a cavity.  |
| <b>Mortise cylinder</b> | Threaded lock cylinder that screws directly into the lock case; usually includes a key-driven rotating cam, attached to the back of the cylinder, which drives the locking mechanism. The cylinder houses the BEST interchangeable core.  |
| <b>Mortise lock</b>     | Lock that fits into a mortise. Other locks fit into bored holes or mount to a surface.  |
| <b>Rim cylinder</b>     | Lock cylinder that is secured to a door with a clamp plate and clamp screws. The rim cylinder’s spindle actuates the bolt or latch. The cylinder houses the BEST interchangeable core.  |
| <b>Shifting cam</b>     | Spring-loaded cam that shifts back to actuate another mechanism.  |
| <b>Spindle</b>          | Unit on a rim cylinder lock, which actuates the bolt or latch when the key is turned.   |
| <b>Throw member</b>     | Connecting piece between core and lock mechanism that transfers key motion to the locking device.   |
| <b>Thumbturn</b>        | Part that someone grips between the thumb and forefinger, and turns to project or retract a bolt.   |



# D

---

---

## INSTALLATION INSTRUCTIONS

The following pages contain *Installation Instructions for 1E Mortise Cylinders* and *Installation Instructions for 1E Rim Cylinders*.





# Installation Instructions for 1E Mortise Cylinders

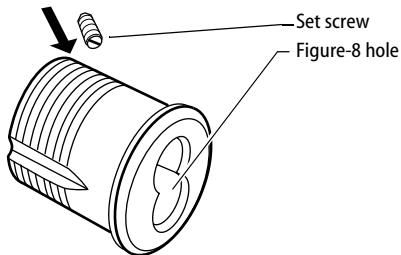
Use these instructions to install a BEST 1E mortise cylinder in either a BEST mortise lock or another manufacturer's mortise lock.

**Caution:** Other lock manufacturers may make changes to their product that affect the operation or compatibility of the BEST cylinder. When this occurs, they are not obligated to notify us.

If you are using a BEST cylinder in another manufacturer's lock and find that it does not operate properly, please contact your local BEST representative.

## 1 Install cylinder set screw

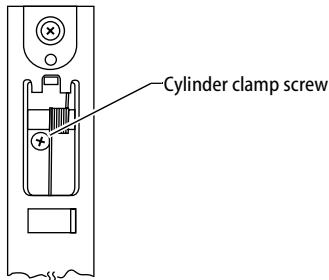
- 1 From the outside of the cylinder, thread the set screw, slotted head first, as shown in Figure 1.
- 2 With a narrow screwdriver, insert the blade through the figure-8 hole and back the set screw in until the tip of the screw is below the threads of the cylinder.



*Figure 1 Threading the set screw into the cylinder*

## 2 Install cylinder

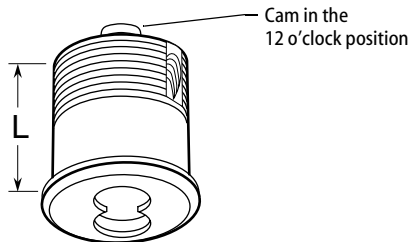
- 1 Loosen the cylinder clamp screw in the front edge of the mortise lock and remove the old cylinder. See Figure 2.
- 2 Note the length "L" of the old cylinder. See Figure 3. If the BEST cylinder is longer, select a cylinder ring that will provide the correct length.



*Figure 2 Loosening the cylinder clamp screw*

- 3 Turn the cam to the 12 o'clock position as shown in Figure 3.
- 4 With a BEST cylinder wrench, screw the cylinder into the mortise case so that the figure-8 hole stops in the 12 o'clock position and the set screw is to the right.

**Caution:** Do not screw the cylinder in too tightly. Doing so may cause you or someone else to be locked out.



*Figure 3 Turning the cam to the 12 o'clock position*

- 5 Tighten the set screw into the mortise case. This prevents a thief from removing the cylinder and figure-8 core.
- 6 Tighten the cylinder clamp screw as shown in Figure 2.

### **3 Install core**

- 1 Put the control key into the core and turn the key 15 degrees clockwise.
- 2 Adjust the throw pins if needed, then put the core into the cylinder with the control key.
- 3 Turn the key 15 degrees counterclockwise and remove the key.

**BEST ACCESS SYSTEMS**

Indianapolis, Indiana



# Installation Instructions for 1E Rim Cylinders

Use these instructions to install a BEST 1E rim cylinder in rim lock applications.

## Only if you are replacing a cylinder:

- 1 Remove the lock case (examples of lock cases include rim locks and panic devices) from the inside of the door and remove the cylinder.
- 2 Measure and make note of the length of the old ring, spindle, and screws. See Figure 1.

## 1 Prepare cylinder

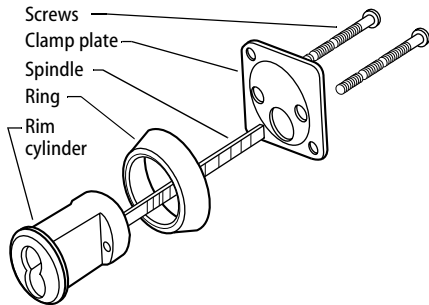
Perform the following steps by either: (a) comparing the new BEST rings, spindle, and screws to the existing ring, spindle, and screws, or (b) trying and measuring the new BEST cylinder in the door with the lock case.

- 1 Select the cylinder ring that will position the cylinder to the correct length.
- 2 Break off the spindle at the point that will position it to the correct length.

- 3 Break off the screws so that the clamp plate and cylinder will tighten onto the door.

## 2 Install cylinder

- 1 Insert the BEST cylinder from the outside of the door and secure it in place with the clamp plate. See Figure 1.



*Figure 1 Securing the rim cylinder*

**Note:** Make sure that the cylinder stays in the upright, centered position and that the spindle stays in the spindle hole in the lock case.

- 2 Reinstall the lock case.
- 3 Check the installation by inserting the key and turning. The key will operate the bolt freely if the cylinder and case are in proper alignment.

### 3 Install core

- 1 Put the control key into the core and turn the key 15 degrees clockwise. See Figure 2.

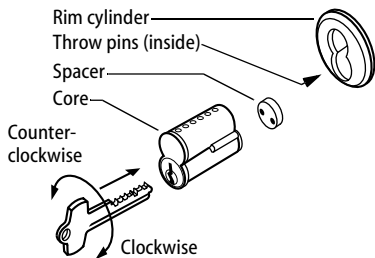


Figure 2 Installing the spacer (six-pin cores only) and core

- 2 When installing a six-pin core, slide the spacer onto the throw pins.
- 3 Adjust the throw pins if needed, then put the core into the cylinder with the control key.
- 4 Turn the key 15 degrees counterclockwise and remove the key.

# E

---

## INDEX

### Numerics

- 1E direct motion cabinet cylinder
  - cam rotations [5-16](#)
  - part numbers and drawings for [2-5](#)
  - reinstalling [5-14](#)
  - removing [5-13](#)
- 1E dust cover cylinder [2-7](#)
- 1E lost motion cabinet cylinder
  - cam rotations [5-17](#)
  - part numbers and drawings for [2-6](#)
  - reinstalling [5-14](#)
  - removing [5-13](#)
- 1E mortise cylinder
  - part numbers and drawings for [2-2](#)
  - reinstalling [5-4](#)
  - removing [5-2](#)
- 1E non-UL high security cylinder [2-8](#)
- 1E rim cylinder
  - part numbers and drawings for [2-3](#)
  - reinstalling [5-10](#)
  - removing [5-10](#)
- 1E tapered-head cylinder [2-8](#)
- 1E thumbturn cylinder [2-4](#)
- 1E wrench-resistant cylinder [2-7](#)
- 3E mortise cylinder
  - part numbers and drawings for [3-2](#)
  - reinstalling [5-4](#)
  - removing [5-2](#)
- 5E limited motion cabinet cylinder
  - cam rotations [5-22](#)
  - part numbers and drawings for [4-3](#)
  - reinstalling [5-14](#)
  - removing [5-13](#)

- 5E lost motion cabinet cylinder
  - cam rotations [5-18](#)
  - part numbers and drawings for [4-2](#)
  - reinstalling [5-14](#)
  - removing [5-13](#)

### C

- cam driver [2-6](#), [4-2](#)
- cam rotations
  - for 1E Series [5-16](#)
  - for 5E limited motion cabinet cylinders [5-22](#)
  - for 5E lost motion cabinet cylinders [5-18](#)
- cam stop pin [2-6](#)
- cams for 1E series
  - cabinet cams [2-20](#)
  - cloverleaf cams [2-19](#)
  - reinstalling [5-9](#)
  - removing [5-8](#)
  - roller cams [2-23](#)
  - straight cams [2-15](#)
  - two-point cams [2-24](#)
- cams for 3E Series
  - cloverleaf cams [3-4](#)
  - roller cams [3-5](#)
  - straight cams [3-4](#)
- cams for 5E series [4-7](#)
- certifications and standards [1-2](#)
- clamp plate [2-3](#)
- cylinder [2-2](#) to [2-6](#), [3-2](#)
- cylinder and plug assembly [4-2](#) to [4-3](#)

cylinder rings for 1E Series  
part numbers and drawings for 2-10  
reinstalling 5-7  
removing 5-7  
cylinder rings for 3E Series  
part numbers and drawings for 3-3  
reinstalling 5-7  
removing 5-7  
cylinder rings for 5E Series  
determining the ring length 4-4  
part numbers and drawings for 4-5

## D

documentation package  
see technical documentation package  
drawings  
see part numbers and drawings  
drive pin 4-2  
dummy trim  
for 1E mortise cylinders 2-9  
for 1E rim cylinders 2-9

## E

exploded diagrams  
see part numbers and drawings

## G

groove pin 4-2 to 4-3

## H

hotel shifting cam cylinder, 1E 2-8

## L

lock washer 4-2 to 4-3

## M

mounting plates  
for 1E series 2-13  
for 5E series 4-6

## N

nut 2-5 to 2-6, 4-2 to 4-3

## P

part numbers and drawings  
for 1E cams 2-15  
for 1E cylinder rings 2-10  
for 1E direct motion cabinet cylinder 2-5  
for 1E dust cover cylinder 2-7  
for 1E hotel cylinder 2-8  
for 1E lost motion cabinet cylinder 2-6  
for 1E mortise cylinder 2-2  
for 1E mounting plates 2-13  
for 1E non-UL high security cylinder 2-8  
for 1E rim cylinder 2-3  
for 1E tapered-head cylinder 2-8  
for 1E thumbturn cylinder 2-4  
for 1E wrench-resistant cylinder 2-7  
for 3E cams 3-4  
for 3E cylinder rings 3-3  
for 3E mortise cylinder 3-2  
for 5E cams 4-7  
for 5E cylinder rings 4-5  
for 5E limited motion cabinet cylinder 4-3  
for 5E lost motion cabinet cylinder 4-2  
for 5E mounting plates 4-6

## R

reinstalling  
1E cylinder ring 5-7  
1E direct motion cabinet cylinder 5-14  
1E lost motion cabinet cylinder 5-14  
1E mortise cylinder 5-4  
1E rim cylinder 5-10  
1E riveted cam 5-9  
3E cylinder ring 5-7  
3E mortise cylinder 5-4  
5E limited motion cabinet cylinder 5-14  
5E lost motion cabinet cylinder 5-14  
spindle 5-12

removing

1E cylinder ring 5-7  
1E direct motion cabinet cylinder 5-13  
1E lost motion cabinet cylinder 5-13  
1E mortise cylinder 5-2  
1E rim cylinder 5-10  
1E riveted cam 5-8  
3E cylinder ring 5-7  
3E mortise cylinder 5-2  
5E limited motion cabinet cylinder 5-13  
5E lost motion cabinet cylinder 5-13  
spindle 5-12  
rim cylinder  
see 1E rim cylinder  
rings  
see cylinder rings

## S

set screw 2-2, 3-2  
slide cap 4-2 to 4-3  
spacer 2-2 to 2-3, 2-5 to 2-6, 3-2  
spindle  
part numbers and drawings for 2-3  
reinstalling 5-12  
removing 5-12  
spring 2-4  
spring plug 2-4  
stamped head 2-2, 3-2  
stop plate 4-3  
support, technical  
see technical support

## T

technical documentation package 1-3  
technical support 1-3  
throw member assembly 2-6  
throw member retainer 2-3  
throw pin 2-2, 2-5, 3-2  
throw plug 2-2, 2-5, 3-2, 4-2  
throw plug assembly 2-3  
throw plug retainer 2-5  
thumbturn 2-4  
tools  
for 1E series 2-14  
for 3E series 3-3  
for 5E series 4-6